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Presentation of Four-stroke Engine Design Elements

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Abstract: Having escaped the shadow of the global energy crisis by implementing nuclear fission, wind, solar, bioenergy, but also by producing and extracting (deep) gases capable of providing us with planetary reserves for two more. Or at least three thousand years, we have started to relax more energetically, but due to the huge pollution produced by cars, the rules of their increasingly drastic operation are constantly imposed, the cars always being equipped with new devices capable of reducing the level of the harm produced by them. The work presents a few original elements about the dynamic and kinematics of piston mechanism, used like motor mechanism from OTTO engines. One presents an original method to determine the efficiency of the piston mechanism used like a motor mechanism. With the relations of motor efficiency and piston acceleration on optimizing the Otto mechanism, which is the principal mechanism from internal-combustion engines. This is the way to diminish the acceleration of the piston and to maximize the efficiency of the motor mechanism. One optimizes the constructive parameters: e, r, l, having in view the rotation speed of drive shaft, n.

Keywords: Machines, Engines, Robots, Automation, Mechatronic Systems, Structure, Kinematics, Dynamics, Engine Design

Introduction

The problem of replacing thermal motors with electric motors and vehicles equipped with internal combustion engines on gasoline, diesel or gas, with vehicles equipped with electric motors is becoming more and more pronounced.

Having escaped the shadow of the global energy crisis by implementing nuclear fission, wind, solar, bioenergy, but also by producing and extracting (deep) gases capable of providing us with planetary reserves for two more or at least three thousand years, we have started to relax more energetically, but due to the huge pollution produced by cars, the rules of their increasingly drastic operation are constantly imposed, the cars always being equipped with new devices capable of reducing the level of the harm produced by them.

Today, there are possibilities to create petroleum fuels from water or air using only photovoltaic solar energy, which would guarantee the production of classic fuels in any quantity to infinity, not to mention the fact that the gas extracted from the deep can be processed (in large plants) in liquid gases, diesel, gasoline or kerosene, they are now extracted in huge quantities for large periods of time, with the possibility of their permanent restoration. In addition, the humanity that has already tasted from the world energy crisis several times in a row has learned the mind and has taken drastic measures that now allow us even an energy relaxation.

One has additional fuels, bio, from vegetable oils, from algae, from plantations, or we can use hydrogen as a fuel and it can be extracted in any quantity by various methods, including from the water.

Today, fuel cell-type cars are already circulating that burn hydrogen in cells, in order not to explode and the heat obtained is chemically transformed into electrical energy stored in large lithium-ion batteries.

Already operating for about 20 years all kinds of hybrid vehicles, with combined solutions, gasoline-electric, diesel-electric, gas, gas-electric and all kinds of other possible variants, along with cars equipped with increasingly efficient electric motors, with increasing autonomy and shorter loading times.

We are constantly trying and improving the solutions with magnetic motors even though the life of the magnetized materials is still very short. There are also attempts to put the Watt or Stirling type external combustion thermal engines back into operation, some of them being successful.

In countries like Brazil, the USA, Germany, large quantities of biofuels, such as vegetable oils or vegetable alcohols, are used.

New and emerging solutions are always being tested, including cars with water, which could change the face of the world once started.

However, considering that the fleet of cars equipped with internal combustion thermal engines has far exceeded one billion worldwide and approximately 100 million cars equipped with the classic Otto engines are produced and introduced into circulation annually, the most immediate measure of reducing fuel and energy consumption, as well as of the harm produced by all these cars, their continuous improvement remains (Aabadi, 2019; Antonescu and Petrescu, 1985; 1989; Antonescu *et al*., 1985a; 1985b; 1986; 1987; 1988; 1994; 1997; 2000a; 2000b; 2001; Aversa *et al*., 2017a; 2017b; 2017c; 2017d; 2017e; 2016a; 2016b; 2016c; 2016d; 2016e; 2016f; 2016g; 2016h; 2016i; 2016j; 2016k; 2016l; 2016m; 2016n; 2016o; Cao *et al*., 2013; Dong *et al*., 2013; Comanescu, 2010; Franklin, 1930; He *et al*., 2013; Lee, 2013; Lin *et al*., 2013; Liu *et al*., 2013; Padula and Perdereau, 2013; Perumaal and Jawahar, 2013; Petrescu, 2011; 2015a; 2015b; Petrescu and Petrescu, 1995a; 1995b; 1997a; 1997b; 1997c; 2000a; 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Tourab *et al*., 2011; Raptis *et al*., 2011; Momani *et al*., 2011; Ismail *et al*., 2011; Anizan *et al*., 2011; Tsolakis and Raptis, 2011; Abdullah *et al*., 2011; Kechiche *et al*., 2011; Ho *et al*., 2011; Rajbhandari *et al*., 2011; Aleksic and Lovric, 2011; Kaewnai and Wongwises, 2011; Idarwazeh, 2011; Ebrahim *et al*., 2012; Abdelkrim *et al*., 2012; Mohan *et al*., 2012; Abam *et al*., 2012; Hassan *et al*., 2012; Jalil and Sampe, 2013; Jaoude and El-Tawil, 2013; Ali and Shumaker, 2013; Zhao, 2013; El-Labban *et al*., 2013; Djalel *et al*., 2013; Nahas and Kozaitis, 2014; Petrescu and Petrescu, 2014a; 2014b; 2014c; 2014d; 2014e; 2014f; 2014g; 2014h; 2014i; 2015a; 2015b; 2015c; 2015d; 2015e; 2016a; 2016b; 2016c; 2016d; Fu *et al*., 2015; Al-Nasra *et al*., 2015; Amer *et al*., 2015; Sylvester *et al*., 2015b; Kumar *et al*., 2015; Gupta *et al*., 2015; Stavridou *et al*., 2015b; Casadei, 2015; Ge and Xu, 2015; Moretti, 2015; Wang *et al*., 2015; Petrescu *et al*., 2017af-aj; 2018o-v; Petrescu, 2015c; 2018a-b; Petrescu and Petrescu, 2018a-b; Petrescu and Petrescu, 2014f; 2014g; 2014h; 2014i).

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Materials and Methods

The paper presents an original method of studying PISTON mechanisms used in internal combustion engines.

There are several diagrams, which take into account the acceleration of the piston according to the rotation angle of the crank. The efficiency of the entire mechanism is specified in each diagram, so that the designer (the motorist) can select the optimum dimensions of the elements of the mechanism (optimum design of the mechanism), according to the required input parameters, so that the motor mechanism works with maximum efficiency and keep the maximum acceleration values within normal allowable limits, regardless of the speed at which the engine will operate. The basic input elements (input parameters) are the crank length, r, connecting rod length, l, piston working axis offset relative to crank axis (motor shaft), e and engine working speed (shaft speed). motor). The main output parameters that need to be optimized are the piston acceleration, a and the total mechanical efficiency of the crank-piston-crank system, η.

The study is kinematic, but given that the total efficiency of the motor mechanism is constantly being pursued, it is possible to speak of a dual, kinematic-dynamic method.

In Fig. 1 you can see the diagram of the acceleration of the piston according to the rotation angle of the cam:

The efficiency of the motor mechanism is about 60%. A lower r/l ratio increases the efficiency of the mechanism and e will decrease efficiency when it takes values other than zero. Engine speed (motor shaft) does not directly influence the efficiency of the mechanism, but its increase produces a rapid increase in piston acceleration. As the peaks of the acceleration can be reduced by reducing the ratio r/l, we will observe how this reduction of the ratio r/l, is beneficial for both low values of acceleration as well as high values of efficiency.

In Fig. 2 the ratio r/l decreases to 0.66 and the yield increases to about 84%.

In Fig. 3 we continue to reduce the ratio r/l to 0.33 and we observe an increase in efficiency to 96%.

In Fig. 4 r/l becomes 0.23 and the efficiency of the motor mechanism acquires a comfortable value of about 98%, which would be sufficient for normal functioning of the mechanism and any further decrease of the r/l ratio appears as unnatural from this point of view. (further reduction of the r/l ratio is no longer necessary after reaching a practical efficiency of 98-99%. However, this reduction may be required for objective reasons when we want to greatly increase engine speed and the maximum acceleration must be maintained. within permissible limits, for example not to exceed the critical threshold of 100,000 [m/s^2]).

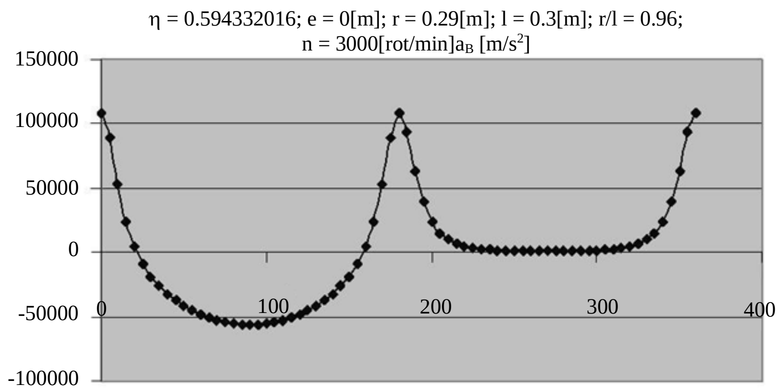

Fig. 1: Offset e = 0 and the ratio r/l = 0.96, for a working speed n = 3000 [rot/min]

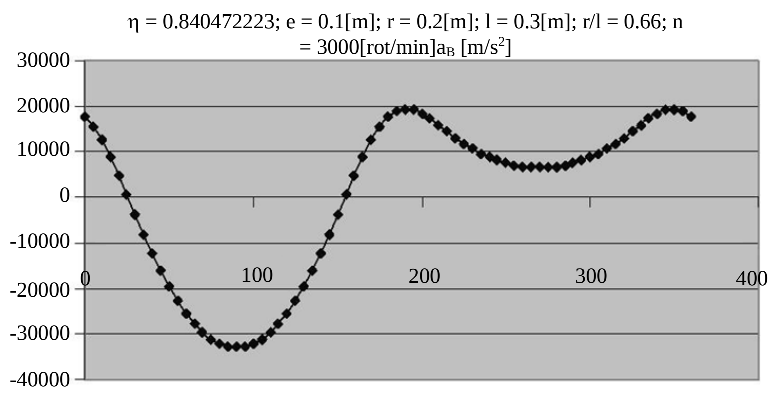

Fig. 2: The ratio r/l decreases to 0.66 and the yield increases to about 84%

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In Fig. 5 r/l becomes 0.16 and η = 0.99.

In Fig. 6 r/l becomes 0.1 and η = 0.99666, a yield value that can be considered 100%.

In Fig. 7 r/l becomes 0.033 and η = 0.9996.

In Fig. 8 the deviation e takes different values from zero e = -0.2 [m], r/l = 0.3 and the efficiency of the motor mechanism decreases considerably η = 0.45.

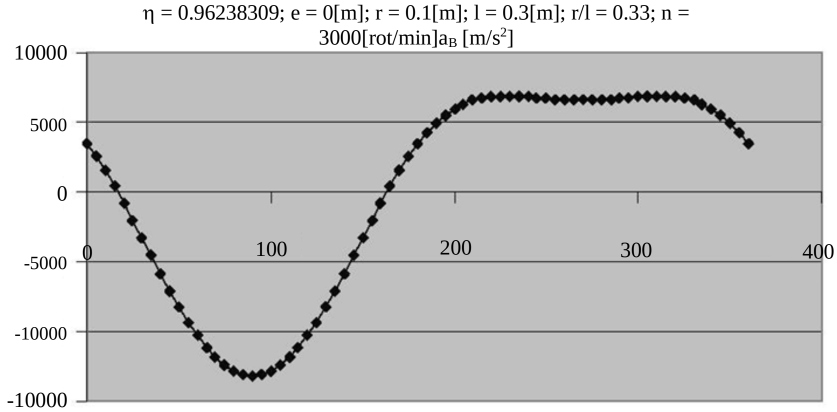

Fig. 3: One continue to reduce the ratio r/l to 0.33 and we observe an increase in efficiency to 96%

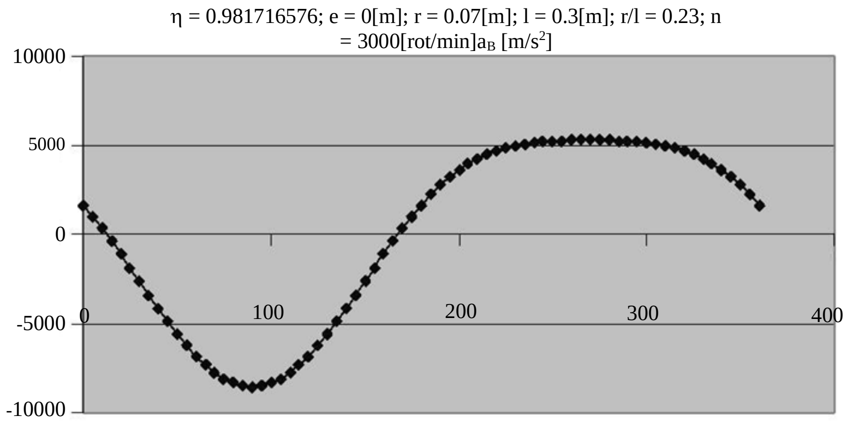

Fig. 4: λ = r/l becomes 0.23 and the efficiency of the motor mechanism acquires a comfortable value of about 98%

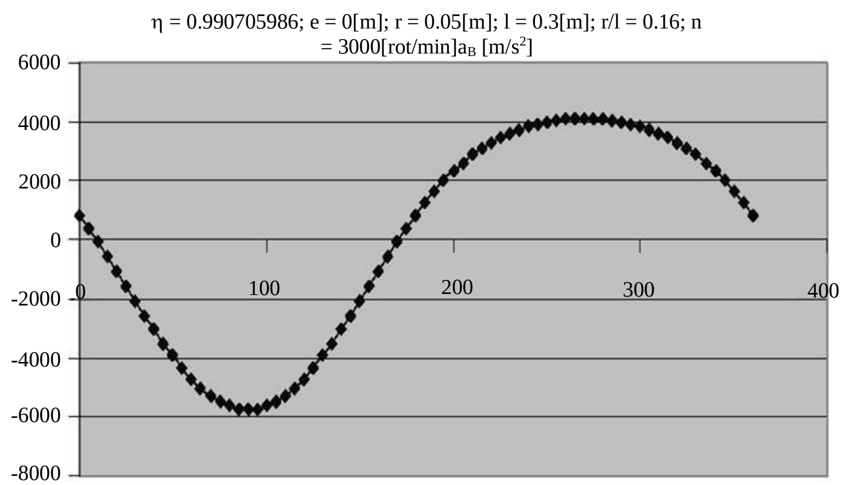

Fig. 5: r/l becomes 0.16 and η = 0.99

DOI: 10.3844/jmrsp.2020.15.41

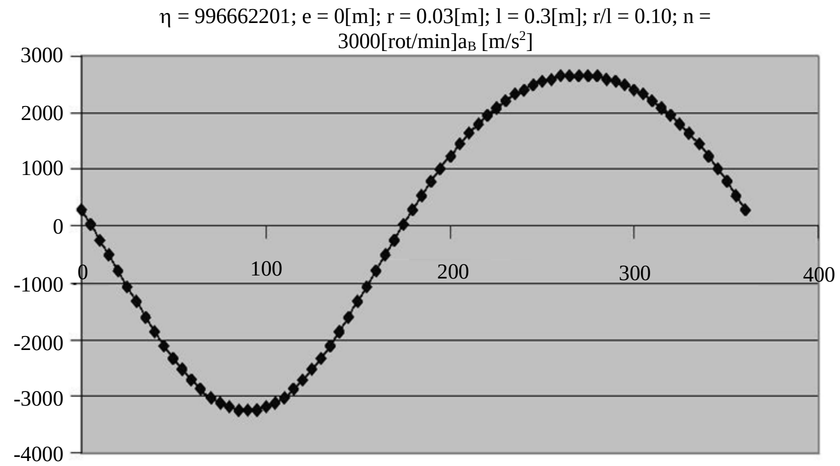

Fig. 6: r/l becomes 0.1 and η = 0.99666, a yield value that can be considered 100%

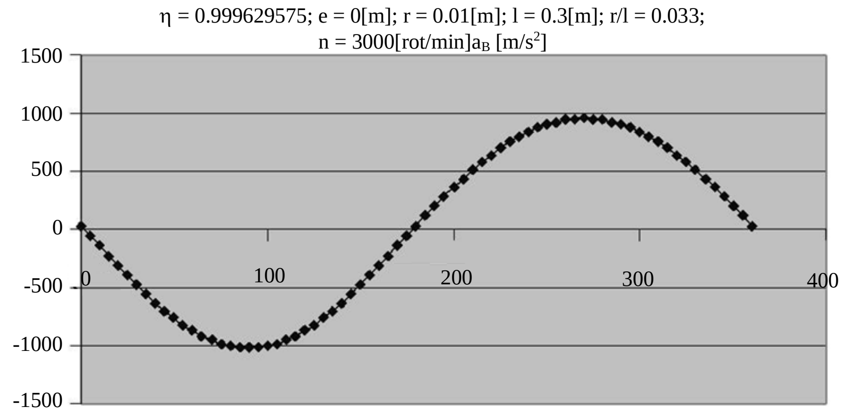

Fig. 7: r/l becomes 0.033 and η = 0.9996

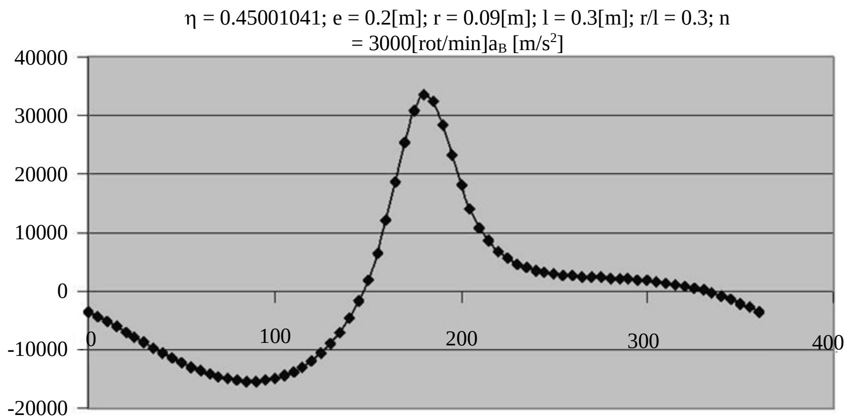

Fig. 8: The deviation e takes different values from zero e = -0.2 [m], r/l = 0.3 and the efficiency of the motor mechanism decreases considerably η = 0.45

In Fig. 10e = 0.1 [m], r/l = 0.63 and η = 0.665.

In Fig. 10e = 0.27 [m], r/l = 0.066 and η = 0.174. It can be observed that if it increases in absolute value then the efficiency of the motor mechanism decreases considerably. In Fig. 11e = -0.27 [m], r/l = 0.066 and the yield is only 17.4%; For e = 0.289 [m], r/l = 0.033, η = 0.058 ie only 6% (Fig. 12).

In Fig. 13 it return to the zero-disassembly mechanism (e = 0); r/l = 0.033 and we are now increasing the engine speed to n = 5500 [rot/min]. The

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efficiency is the same as at the speed of 3000 [rot/min], η = 0.9996 (Fig. 7), but the maximum piston acceleration increases from about 1000 [m/s^2] to about 3000 [m/s^2]. One further increase the engine speed Fig. 14) to n = 10000 [rot/min] and obtain a maximum piston acceleration value of approximately 10,000 [m/s^2].

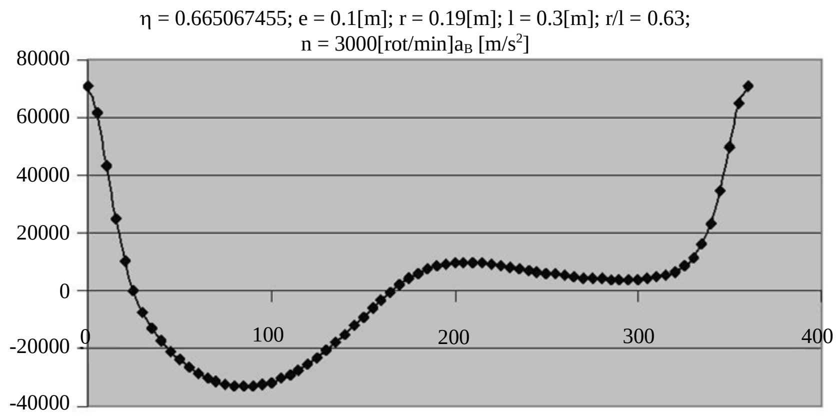

Fig. 9: e = 0.1 [m], r/l = 0.63 and η = 0.665

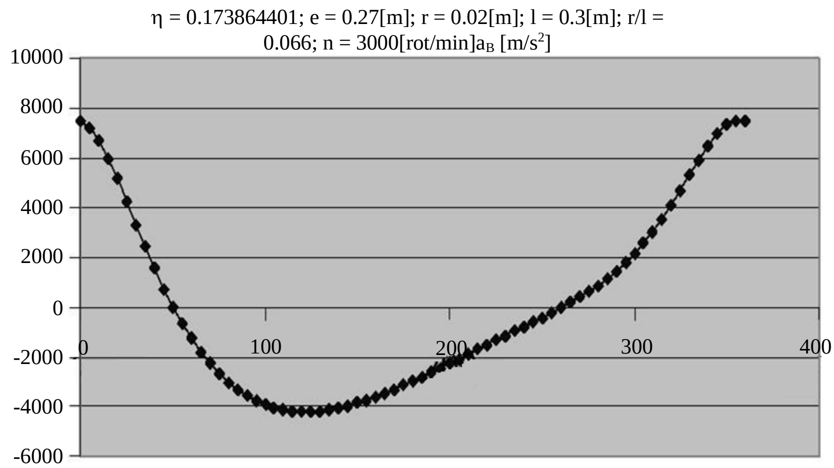

Fig. 10: e = 0.27 [m], r/l = 0.066 and η = 0.174

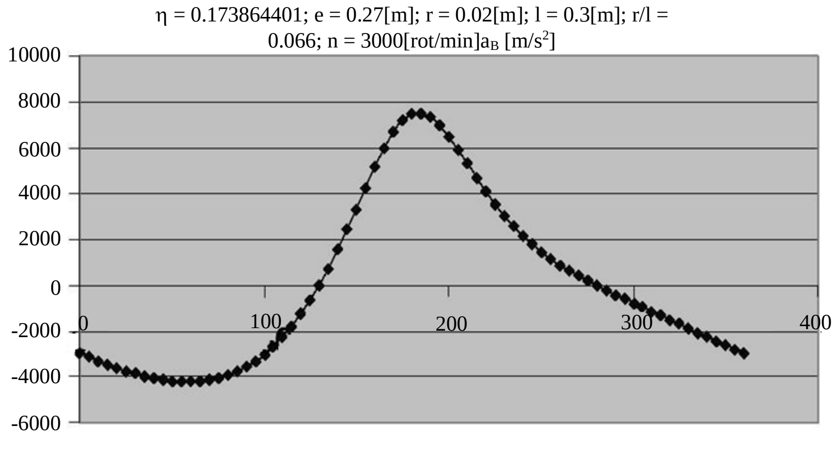

Fig. 11: e = -0.27 [m], r/l = 0.066 and the yield is only 17.4%

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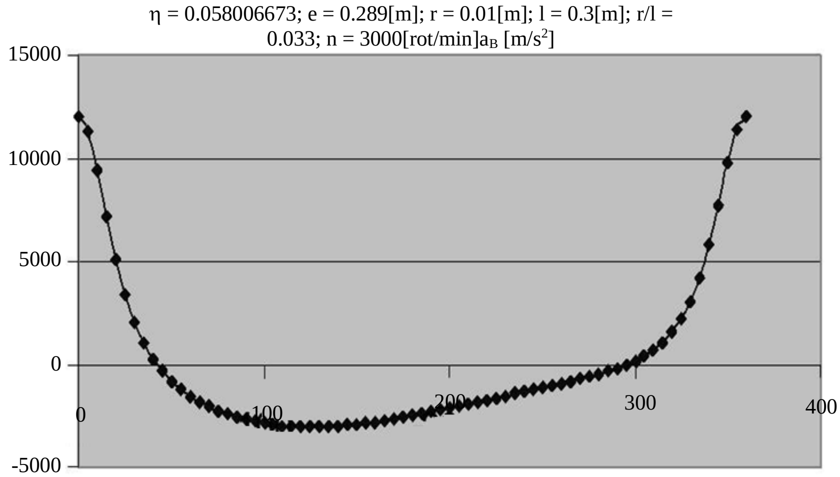

Fig. 12: e = 0.289 [m], r/l = 0.033, η = 0.058 i.e., only 6%

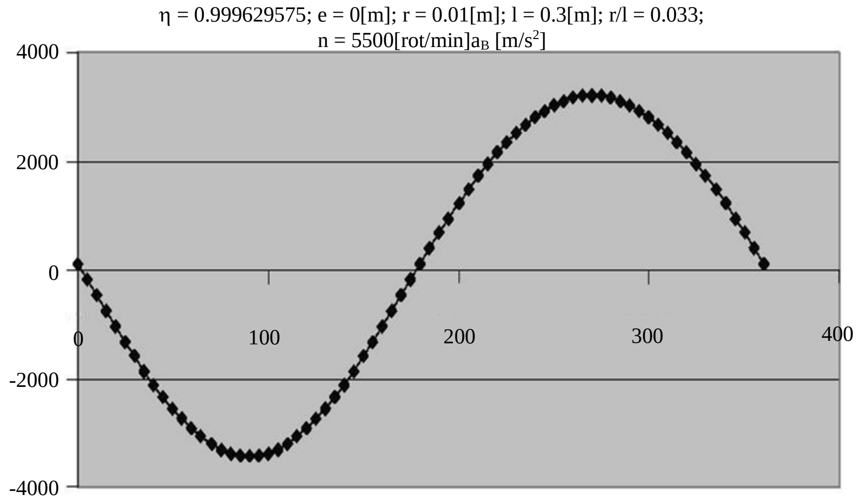

Fig. 13: e = 0; r/l = 0.033; increasing the engine speed to n = 5500 [rot/min]

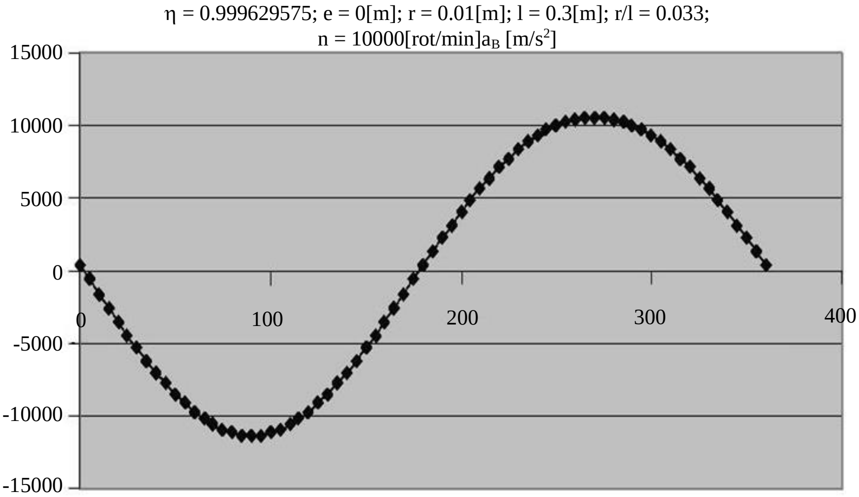

Fig. 14: n = 10000 [rot/min] and obtain a maximum piston acceleration value of approximately 10,000 [m/s^2]

In Fig. 15 we raise the engine speed to the value of 20000 [rot/min] and the maximum acceleration of the piston takes values of about 40000 [m/s^2].

In Fig. 16 we raise the engine speed to 30000 [rot/min] and the maximum piston acceleration takes about 100,000 [m/s^2]. Now a threshold (critical-limit value) has been reached for accelerations, so if we want to continue increasing the engine speed, the only possible way is to further decrease the ratio $\lambda = r/l$.

In Fig. 17 the r/l was reduced to only 0.01 and the efficiency increased to about 99,997%; we remained at the engine speed of n = 30000 [rot/min], but the maximum acceleration decreased to only about 30000 [m/s^2].

Now we can further increase the engine speed to 40,000 [rot/min] and the maximum piston acceleration becomes about 55000 [m/s^2] (Fig. 18).

In Fig. 19 shows the piston acceleration diagram for a motor speed of 50,000 [rot/min]. The acceleration becomes 80000 [m/s^2].

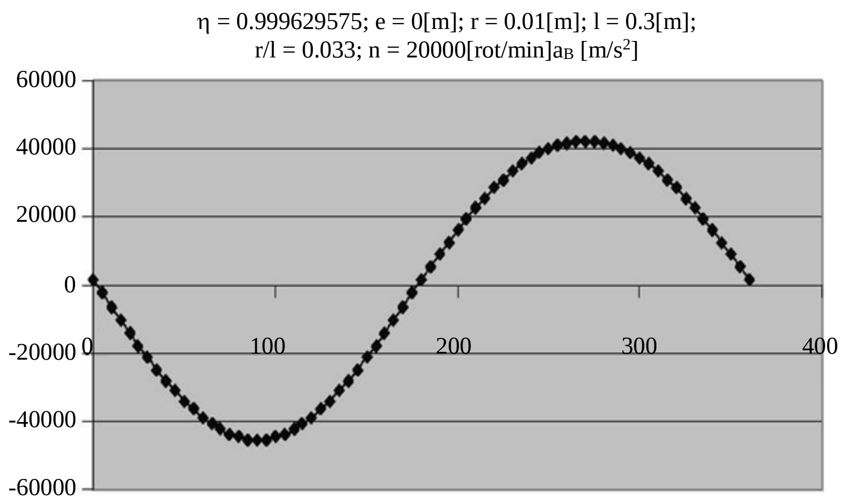

Fig. 15: n = 20000 [rot/min] and the maximum acceleration of the piston takes values of about 40000 [m/s^2]

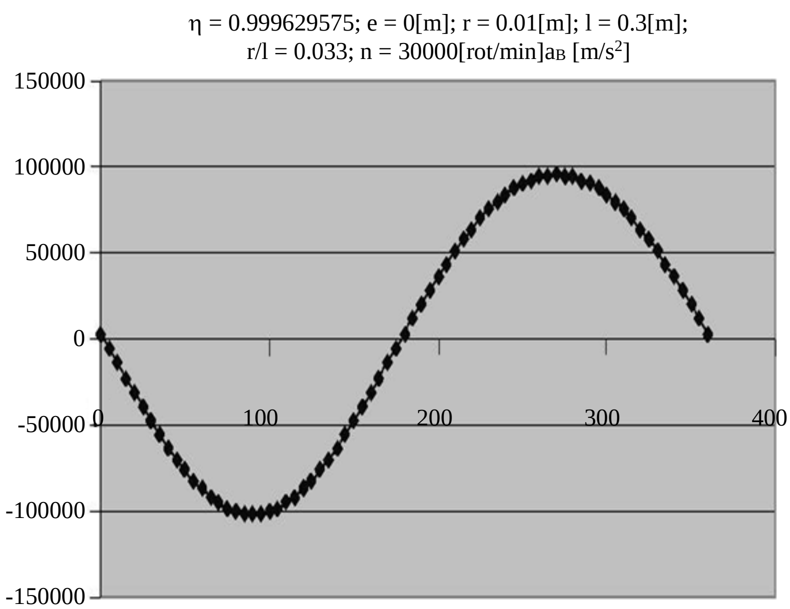

Fig. 16: n = 30000 [rot/min], a_{max} = 100,000 [m/s^2]

DOI: 10.3844/jmrsp.2020.15.41

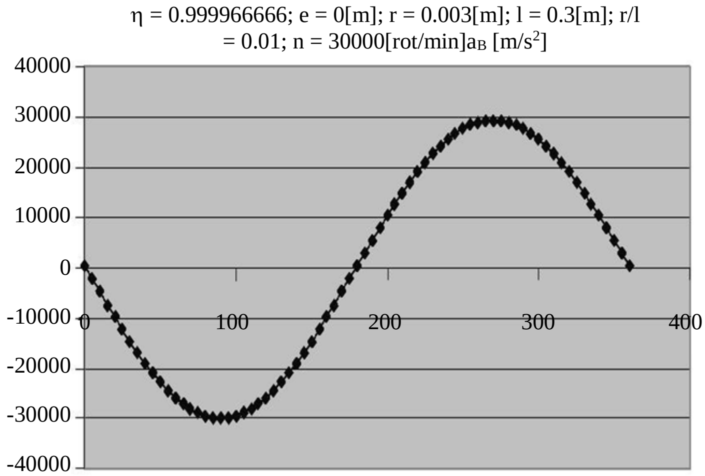

Fig. 17: r/l = 0.01; η= 99,997%; n = 30000 [rot/min], a_{max} = 30000 [m/s^2]

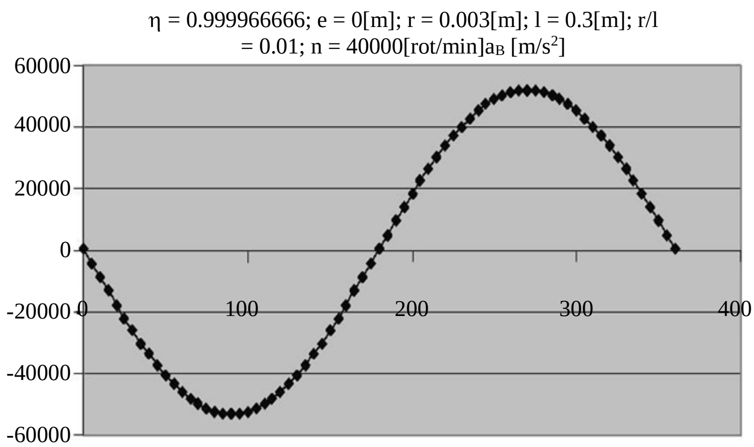

Fig. 18: n = 40,000 [rot/min] and the maximum piston acceleration becomes about 55000 [m/s^2]

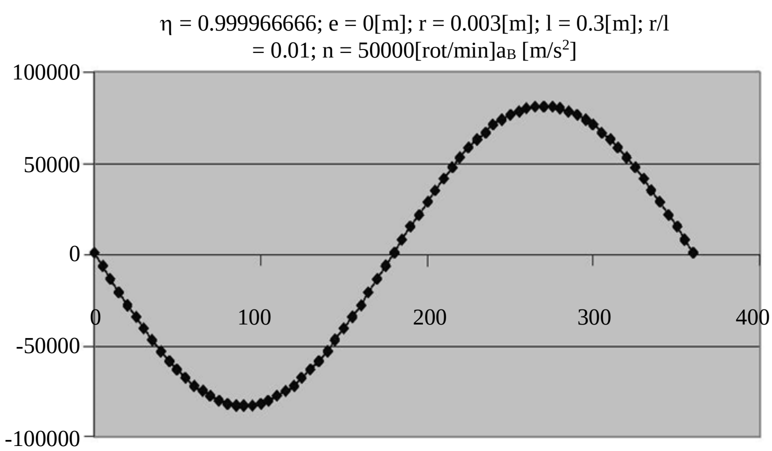

Fig. 19: n = 50,000 [rot/min]. The acceleration becomes 80000 [m/s^2]

In Fig. 20 for an engine speed of 60,000 [rot/min], the maximum acceleration value now exceeds the critical threshold of 100,000 [m/s^2].

Now (Fig. 21) we must again reduce the dimensionless value λ = r/l to only 0.0033; the yield becomes 0.999996 and for an engine speed of 60,000 [rot/min], the maximum piston acceleration is 40,000 [m/s^2].

At n = 70000 [rot/min], a_{max} = 55000 [m/s^2] (Fig. 22):

At n = 80000 [rot/min], amax = 70000 [m/s^2], (Fig. 23):

At n = 90000 [rot/min], amax = 90000 [m/s^2], (Fig. 24):

Finally at n = 100,000 [rot/min], the maximum piston acceleration is about 110000 [m/s^2], (Fig. 25).

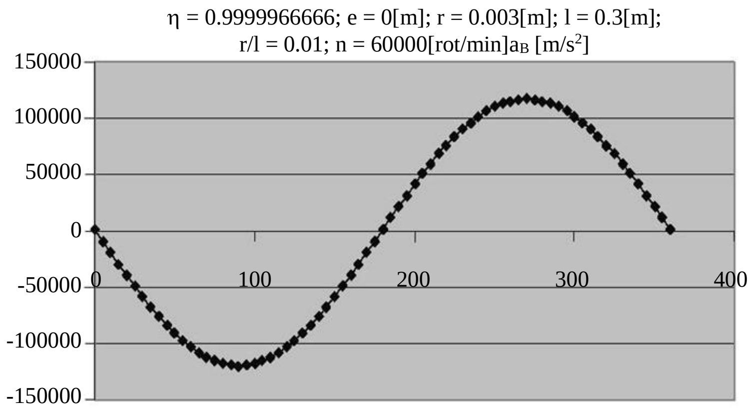

Fig. 20: n = 60,000 [rot/min], the maximum acceleration value now exceeds the critical threshold of 100,000 [m/s^2]

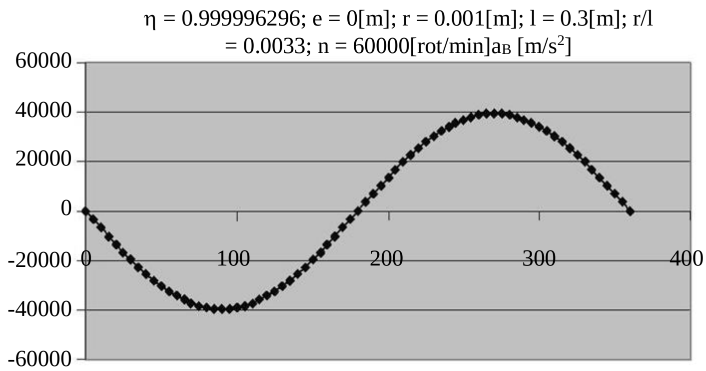

Fig. 21: λ = r/l to only 0.0033; the yield becomes 0.999996 and for an engine speed of 60,000 [rot/min], the maximum piston acceleration is 40,000 [m/s^2]

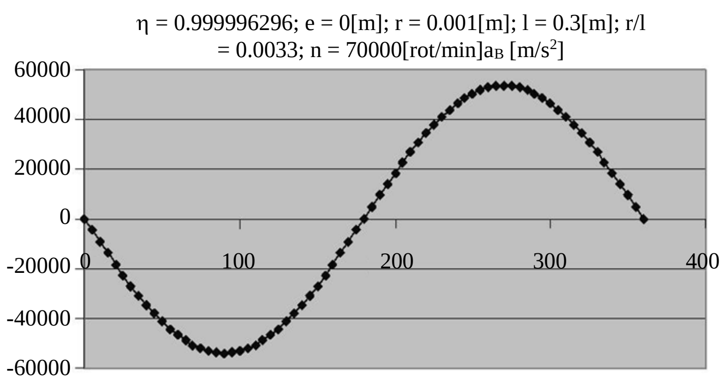

Fig. 22: n = 70000 [rot/min], a_{max} = 55000 [m/s^2]

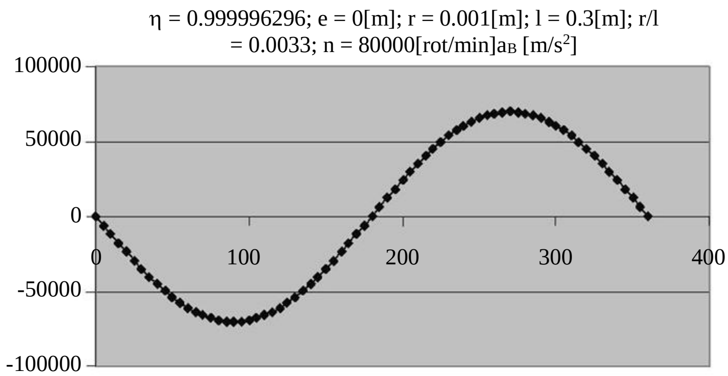

Fig. 23: n = 80000 [rot/min], a_{max} = 70000 [m/s^2]

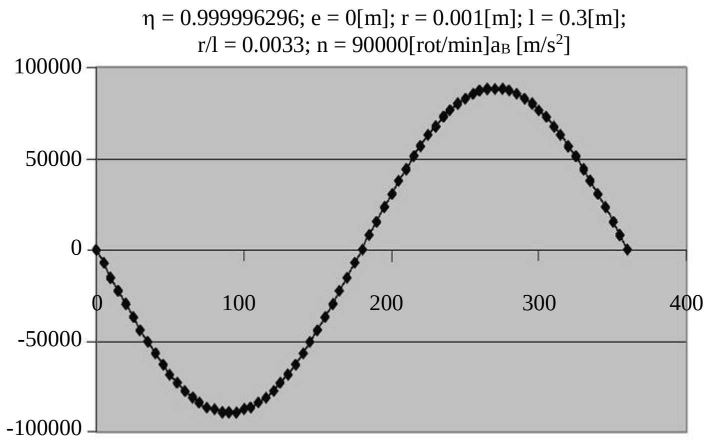

Fig. 24: n = 90000 [rot/min], a_{max} = 90000 [m/s^2]

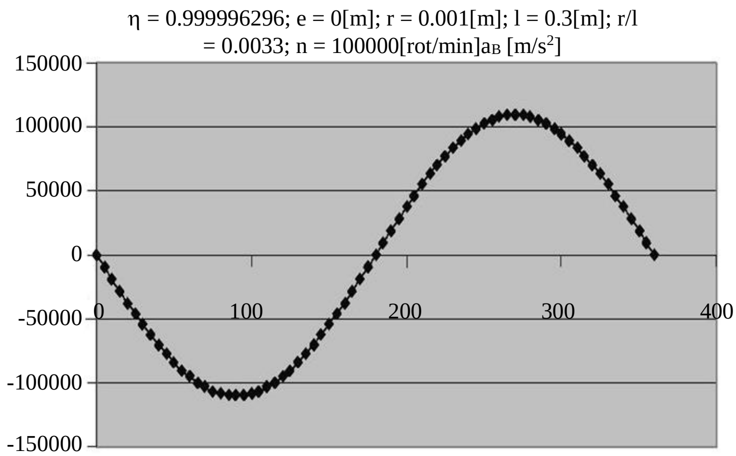

Fig. 25: n = 100,000 [rot/min], a_{max} = 110000 [m/s^2]

Result and Discussion

The calculation relationships used written in the excel program are given in Table 1.

The most interesting situations were considered so that a builder of internal combustion thermal engines can choose the desired case depending on the constructive parameters desired in the design.

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Table 1: The calculation relationships

	A	B
1	e[m] =	0
2	r[m] =	0.001
3	l[m] =	0.3
4	$\Delta\varphi$ [^{0}] =	5
5	φ [^{0}] =	= 0
6	φ [rad] =	= B5*PI()/180
7	sin(φ) =	= SIN(B6)
8	cos(φ) =	= COS(B6)
9	cos(ψ) =	= -(B1+B2*B8)/B3
10	ψ [rad] =	= ACOS(B9)
11	ψ [^{0}] =	= B10*180/PI()
12	sin(ψ) =	= SIN(B10)
13	y_B =	= B2*B7+B3*B12
14	n[rot/min] =	100000
15	ω =	= PI()*B14/30
16	ψp =	= -B2/B3*B7/B12*B15
17	y_Bp =	= B2*B15*B8+B3*B16*B9
18	ψpp =	= -(B2*B15^2*B8+B3*B16 ^2*B9)/(B3*B12)
19	$y_B$pp =	= B3*B18*B9-B2*B15^2*B7 -B3*B16^2*B12
20	λ =	= B2/B3
21	λ = r/l	= B2/B3
22	u_M =	= ACOS(-(B1+B2)/B3)
23	u_m =	= ACOS((B2-B1)/B3)
24	Δu =	= B22-B23
25	Δsin =	= SIN(2*B22)-SIN(2*B23)
26	Δsin/4/Δu =	= B25/B24/4
27	η =	= 1/2-B26

The computational relationships used to determine the total mechanical efficiency of the motor mechanism are original and they are synthesized by the authors through a personal method.

If one try to use the reverse piston mechanism, as a compressor mechanism and not a motor, we were surprised to find that the calculation relationships for determining the efficiency of the compressor mechanism change and the values that can be obtained for the effective efficiency of the compressor are generally much lower. than those of the piston, the maximums being somewhere between 50 and 60%. It can be seen here that the use of the engine mechanism in compressor mode is not efficient.

At the proposed engine mechanisms, at which the ratio λ = r/l decreases greatly, the piston-h stroke decreases and it is proportional to the crank length-r, so if we want to keep the cylinder intact (unchanged) we will have to increase the bore- R. For a decrease of r times n, R will increase $\sqrt{}$ (n) times. The problem arises only for overfilled motors, where the required cylinder size may be smaller, so that the bore increase may be slightly lower. Even under these conditions, very high-speed engines will have an almost imperceptible stroke and a very high bore.

Some diagrams of the piston acceleration, no longer look like the conventional ones (Fig. 1, 2, 8, 9, 10, 11 and 12). Their modified appearance has been specially introduced to highlight the different possible functional regimes of the piston (engine) mechanism. Even if some of them achieve very low yields, they may be usable for some specialized mechanisms!

The OTTO piston mechanism, however, will operate at maximum efficiency, only when used as a motor mechanism, as if it were predestined for this mode of work.

Conclusion

Today, there are possibilities to create petroleum fuels from water or air using only photovoltaic solar energy, which would guarantee the production of classic fuels in any quantity to infinity, not to mention the fact that the gas extracted from the deep can be processed (in large plants) in liquid gases, diesel, gasoline or kerosene, they are now extracted in huge quantities for large periods of time, with the possibility of their permanent restoration. In addition, the humanity that has already tasted from the world energy crisis several times in a row has learned the mind and has taken drastic measures that now allow us even an energy relaxation. We have additional fuels, bio, from vegetable oils, from algae, from plantations, or we can use hydrogen as a fuel and it can be extracted in any quantity by various methods, including from the water.

Today, fuel cell-type cars are already circulating that burn hydrogen in cells, in order not to explode and the heat obtained is chemically transformed into electrical energy stored in large lithium-ion batteries.

Already operating for about 20 years all kinds of hybrid vehicles, with combined solutions, gasoline-electric, diesel-electric, gas, gas-electric and all kinds of other possible variants, along with cars equipped with increasingly efficient electric motors, with increasing autonomy and shorter loading times.

We are constantly trying and improving the solutions with magnetic motors even though the life of the magnetized materials is still very short.

There are also attempts to put the Watt or Stirling type external combustion thermal engines back into operation, some of them being successful.

In countries like Brazil, the USA, Germany, large quantities of biofuels, such as vegetable oils or vegetable alcohols, are used. New and emerging solutions are always being tested, including cars with water, which could change the face of the world once started.

However, considering that the fleet of cars equipped with internal combustion thermal engines has far exceeded one billion worldwide and approximately 100 million cars equipped with the classic Otto engines are produced and introduced into circulation annually, the most immediate measure of reducing fuel and energy consumption, as well as of the harm produced by all these cars, their continuous improvement remains.

The computational relationships used to determine the total mechanical efficiency of the motor mechanism are original and they are synthesized by the authors through a personal method.

If one try to use the reverse piston mechanism, as a compressor mechanism and not a motor, we were surprised to find that the calculation relationships for determining the efficiency of the compressor mechanism change and the values that can be obtained for the effective efficiency of the compressor are generally much lower. than those of the piston, the maximums being somewhere between 50 and 60%. It can be seen here that the use of the engine mechanism in compressor mode is not efficient.

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Some diagrams of the piston acceleration, no longer look like the conventional ones (Fig. 1, 2, 8, 9, 10, 11 and 12). Their modified appearance has been specially introduced to highlight the different possible functional regimes of the piston (engine) mechanism. Even if some of them achieve very low yields, they may be usable for some specialized mechanisms!

The OTTO piston mechanism, however, will operate at maximum efficiency, only when used as a motor mechanism, as if it were predestined for this mode of work.

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Ethics

This article is original and contains unpublished material. Author declares that are not ethical issues and no conflict of interest that may arise after the publication of this manuscript.

References

Aabadi, M.M.L., 2019. Dynamic reliability analysis of steel moment frames using Monte Carlo technique. Am. J. Eng. Applied Sci., 12: 204-213. DOI: 10.3844/ajeassp.2019.204.213

Abam, F.I., I.U. Ugot and D.I. Igbong, 2012. Performance analysis and components irreversibilities of a (25 MW) gas turbine power plant modeled with a spray cooler. Am. J. Eng. Applied Sci., 5: 35-41. DOI: 10.3844/ajeassp.2012.35.41

Abdelkrim, H., S.B. Othman, A.K.B. Salem and S.B. Saoud, 2012. Dynamic partial reconfiguration contribution on system on programmable chip architecture for motor drive implementation. Am. J. Eng. Applied Sci., 5: 15-24. DOI: 10.3844/ajeassp.2012.15.24

Abdullah, H. and S.A. Halim, 2009. Electrical and magnetoresistive studies Nd doped on $La\text{-}Ba\text{-}Mn\text{-}O_3$ manganites for low-field sensor application. Am. J. Eng. Applied Sci., 2: 297-303. DOI: 10.3844/ajeassp.2009.297.303

Abdullah, M., A.F.M. Zain, Y.H. Ho and S. Abdullah, 2009. TEC and scintillation study of equatorial ionosphere: A month campaign over sipitang and parit raja stations, Malaysia. Am. J. Eng. Applied Sci., 2: 44-49. DOI: 10.3844/ajeassp.2009.44.49

Abdullah, M.Z., A. Saat and Z. Hamzah, 2011. Optimization of energy dispersive x-ray fluorescence spectrometer to analyze heavy metals in moss samples. Am. J. Eng. Applied Sci., 4: 3 55-362. DOI: 10.3844/ajeassp.2011.355.362

Abouobaida, H., 2016. Robust and efficient controller to design a standalone source supplied DC and AC load powered by photovoltaic generator. Am. J. Eng. Applied Sci., 9: 894-901. DOI: 10.3844/ajeassp.2016.894.901

Ab-Rahman, M.S., H. Guna, M.H. Harun, S.D. Zan and K. Jumari, 2009. Cost-effective fabrication of self-made 1×12 polymer optical fiber-based optical splitters for automotive application. Am. J. Eng. Applied Sci., 2: 252-259. DOI: 10.3844/ajeassp.2009.252.259

Abu-Ein, S., 2009. Numerical and analytical study of exhaust gases flow in porous media with applications to diesel particulate filters. Am. J. Eng. Applied Sci., 2: 70-75. DOI: 10.3844/ajeassp.2009.70.75

Abu-Lebdeh, M., G. Pérez-de León, S.A. Hamoush, R.D. Seals and V.E. Lamberti, 2016. Gas atomization of molten metal: Part II. Applications. Am. J. Eng. Applied Sci., 9: 334-349. DOI: 10.3844/ajeassp.2016.334.349

Agarwala, S., 2016. A perspective on 3D bioprinting technology: Present and future. Am. J. Eng. Applied Sci., 9: 985-990. DOI: 10.3844/ajeassp.2016.985.990

Ahmed, M., R. Khan, M. Billah and S. Farhana, 2010. A novel navigation algorithm for hexagonal hexapod robot. Am. J. Eng. Applied Sci., 3: 320-327. DOI: 10.3844/ajeassp.2010.320.327

Ahmed, M.K., H. Haque and H. Rahman, 2016. An approach to develop a dynamic job shop scheduling by fuzzy rule-based system and comparative study with the traditional priority rules. Am. J. Eng. Applied Sci., 9: 202-212. DOI: 10.3844/ajeassp.2016.202.212

Akhesmeh, S., N. Pourmahmoud and H. Sedgi, 2008. Numerical study of the temperature separation in the ranque-hilsch vortex tube. Am. J. Eng. Applied Sci., 1: 181-187. DOI: 10.3844/ajeassp.2008.181.187

Al Qadi, A.N.S., M.B.A. Alhasanat and M. Haddad, 2016b. Effect of crumb rubber as coarse and fine aggregates on the properties of asphalt concrete. Am. J. Eng. Applied Sci., 9: 558-564. DOI: 10.3844/ajeassp.2016.558.564

Al Qadi, A.N.S., M.B.A. ALhasanat, A. AL Dahamsheh and S. AL Zaiydneen, 2016a. Using of box-benken method to predict the compressive strength of self-compacting concrete containing Wadi Musa bentonite, Jordan. Am. J. Eng. Applied Sci., 9: 406-411. DOI: 10.3844/ajeassp.2016.406.411

Al Smadi, T.A., 2011. Low cost smart sensor design. Am. J. Eng. Applied Sci., 4: 162-168. DOI: 10.3844/ajeassp.2011.162.168

Al-Abbas, I.K., 2009. Reduced order models of a current source inverter induction motor drive. Am. J. Eng. Applied Sci., 2: 39-43. DOI: 10.3844/ajeassp.2009.39.43

Aleksic, S. and A. Lovric, 2011. Energy consumption and environmental implications of wired access networks. Am. J. Eng. Applied Sci., 4: 531-539. DOI: 10.3844/ajeassp.2011.531.539

Al-Hasan and A.S. Al-Ghamdi, 2016. Energy balance for a diesel engine operates on a pure biodiesel, diesel fuel and biodiesel-diesel blends. Am. J. Eng. Applied Sci., 9: 458-465. DOI: 10.3844/ajeassp.2016.458.465

Alhasanat, M.B., A.N. Al Qadi, O.A. Al Khashman and A. Dahamsheh, 2016. Scanning electron microscopic evaluation of self-compacting concrete spalling at elevated temperatures. Am. J. Eng. Applied Sci., 9: 119-127. DOI: 10.3844/ajeassp.2016.119.127

Ali, G.A.M., O. Fouad and S.A. Makhlouf, 2016. Electrical properties of cobalt oxide/silica nanocomposites obtained by sol-gel technique. Am. J. Eng. Applied Sci., 9: 12-16. DOI: 10.3844/ajeassp.2016.12.16

Ali, K.S. and J.L. Shumaker, 2013. Hardware in the loop simulator for multi-agent unmanned aerial vehicles environment. Am. J. Eng. Applied Sci., 6: 172-177. DOI: 10.3844/ajeassp.2013.172.177

Al-Nasra, M.D. and T.M. Abu-Lebdeh, 2015. The use of the super absorbent polymer as water blocker in concrete structures. Am. J. Eng. Applied Sci., 8: 659-665. DOI: 10.3844/ajeassp.2015.659.665

Alwetaishi, M.S., 2016. Impact of building function on thermal comfort: A review paper. Am. J. Eng. Applied Sci., 9: 928-945. DOI: 10.3844/ajeassp.2016.928.945

Aly, W.M. and M.S. Abuelnasr, 2010. Electronic design automation using object oriented electronics. Am. J. Eng. Applied Sci., 3: 121-127. DOI: 10.3844/ajeassp.2010.121.127

Amani, N., 2016. Design and implementation of optimum management system using cost evaluation and financial analysis for prevention of building failure. Am. J. Eng. Applied Sci., 9: 281-296. DOI: 10.3844/ajeassp.2016.281.296

Amer, S., S. Hamoush and T.M. Abu-Lebdeh, 2015. Experimental evaluation of the raking energy in damping system of steel stud partition walls. Am. J. Eng. Applied Sci., 8: 666-677. DOI: 10.3844/ajeassp.2015.666.677

Anizan, S., K. Yusri, C.S. Leong, N. Amin and S. Zaidi *et al*., 2011. Effects of the contact resistivity variations of the screen-printed silicon solar cell. Am. J. Eng. Applied Sci., 4: 328-331. DOI: 10.3844/ajeassp.2011.328.331

Antonescu, P. and F. Petrescu, 1985. An analytical method of synthesis of cam mechanism and flat stick. Proceedings of the 4th International Symposium on Theory and Practice of Mechanisms, (TPM' 89), Bucharest.

Antonescu, P. and F. Petrescu, 1989. Contributions to kinetoplast dynamic analysis of distribution mechanisms. Bucharest.

Antonescu, P., F. Petrescu and D. Antonescu, 1997. Geometrical synthesis of the rotary cam and balance tappet mechanism. Bucharest, 3: 23-23.

Antonescu, P., F. Petrescu and O. Antonescu, 1994. Contributions to the synthesis of the rotating cam mechanism and the tip of the balancing tip. Brasov.

Antonescu, P., F. Petrescu and O. Antonescu, 2000a. Contributions to the synthesis of the rotary disc-cam profile. Proceedings of the 8th International Conference on the Theory of Machines and Mechanisms, (TMM' 00), Liberec, Czech Republic, pp: 51-56.

Antonescu, P., F. Petrescu and O. Antonescu, 2000b. Synthesis of the rotary cam profile with balance follower. Proceedings of the 8th Symposium on Mechanisms and Mechanical Transmissions, (MMT' 00), Timişoara, pp: 39-44.

Antonescu, P., F. Petrescu and O. Antonescu, 2001. Contributions to the synthesis of mechanisms with rotary disc-cam. Proceedings of the 8th IFToMM International Symposium on Theory of Machines and Mechanisms, (TMM' 01), Bucharest, ROMANIA, pp: 31-36.

Antonescu, P., M. Oprean and F. Petrescu, 1985a. Contributions to the synthesis of oscillating cam mechanism and oscillating flat stick. Proceedings of the 4th International Symposium on Theory and Practice of Mechanisms, (TPM' 85), Bucharest.

Antonescu, P., M. Oprean and F. Petrescu, 1985b. At the projection of the oscillate cams, there are mechanisms and distribution variables. Proceedings of the 5th Conference of Engines, Automobiles, Tractors and Agricultural Machines, (TAM' 58), I-Motors and Cars, Brasov.

Antonescu, P., M. Oprean and F. Petrescu, 1986. Projection of the profile of the rotating camshaft acting on the oscillating plate with disengagement. Proceedings of the 3rd National Computer-aided Design Symposium in the field of Mechanisms and Machine Parts, (MMP' 86), Brasov.

Antonescu, P., M. Oprean and F. Petrescu, 1987. Dynamic analysis of the cam distribution mechanisms. Proceedings of the 7th National Symposium on Industrial Robots and Space Mechanisms, (RSM' 87), Bucharest.

Antonescu, P., M. Oprean and F. Petrescu, 1988. Analytical synthesis of Kurz profile, rotating the flat cam. Mach, Build. Rev.

Ascione, F., N. Bianco, R.F. De Masi, F. de Rossi and C. De Stasio *et al*., 2016. Energy audit of health care facilities: Dynamic simulation of energy performances and energy-oriented refurbishment of system and equipment for microclimatic control. Am. J. Eng. Applied Sci., 9: 814-834. DOI: 10.3844/ajeassp.2016.814.834

Augustine, A., R.D. Prakash, R. Xavier and M.C. Parassery, 2016. Review of signal processing techniques for detection of power quality events. Am. J. Eng. Applied Sci., 9: 364-370. DOI: 10.3844/ajeassp.2016.364.370

Aversa, R., F.I.T. Petrescu, R.V. Petrescu and A. Apicella, 2016a. Biomimetic FEA bone modeling for customized hybrid biological prostheses development. Am. J. Applied Sci., 13: 1060-1067. DOI: 10.3844/ajassp.2016.1060.1067

Aversa, R., D. Parcesepe, R.V. Petrescu, G. Chen and F.I.T. Petrescu *et al*., 2016b. Glassy amorphous metal injection molded induced morphological defects. Am. J. Applied Sci., 13: 1476-1482. DOI: 10.3844/ajassp.2016.1476.1482.

Aversa, R., R.V. Petrescu, F.I.T. Petrescu and A. Apicella, 2016c. Smart-factory: Optimization and process control of composite centrifuged pipes. Am. J. Applied Sci., 13: 1330-1341. DOI: 10.3844/ajassp.2016.1330.1341

Aversa, R., F. Tamburrino, R.V. Petrescu, F.I.T. Petrescu and M. Artur *et al*., 2016d. Biomechanically inspired shape memory effect machines driven by muscle like acting NiTi alloys. Am. J. Applied Sci., 13: 1264-1271. DOI: 10.3844/ajassp.2016.1264.1271

Aversa, R., E.M. Buzea, R.V. Petrescu, A. Apicella and M. Neacsa *et al*., 2016e. Present a mechatronic system having able to determine the concentration of carotenoids. Am. J. Eng. Applied Sci., 9: 1106-1111. DOI: 10.3844/ajeassp.2016.1106.1111

Aversa, R., R.V. Petrescu, R. Sorrentino, F.I.T. Petrescu and A. Apicella, 2016f. Hybrid ceramo-polymeric nanocomposite for biomimetic scaffolds design and preparation. Am. J. Eng. Applied Sci., 9: 1096-1105. DOI: 10.3844/ajeassp.2016.1096.1105

Aversa, R., V. Perrotta, R.V. Petrescu, C. Misiano and F.I.T. Petrescu *et al*., 2016g. From structural colors to super-hydrophobicity and achromatic transparent protective coatings: Ion plating plasma assisted TiO_2 and SiO_2 nano-film deposition. Am. J. Eng. Applied Sci., 9: 1037-1045. DOI: 10.3844/ajeassp.2016.1037.1045

A Aversa, R., R.V. Petrescu, F.I.T. Petrescu and A. Apicella, 2016h. Biomimetic and evolutionary design driven innovation in sustainable products development. Am. J. Eng. Applied Sci., 9: 1027-1036. DOI: 10.3844/ajeassp.2016.1027.1036

Aversa, R., R.V. Petrescu, A. Apicella and F.I.T. Petrescu, 2016i. Mitochondria are naturally micro robots - a review. Am. J. Eng. Applied Sci., 9: 991-1002. DOI: 10.3844/ajeassp.2016.991.1002

versa, R., R.V. Petrescu, A. Apicella and F.I.T. Petrescu, 2016j. We are addicted to vitamins C and E-A review. Am. J. Eng. Applied Sci., 9: 1003-1018. DOI: 10.3844/ajeassp.2016.1003.1018

Aversa, R., R.V. Petrescu, A. Apicella and F.I.T. Petrescu, 2016k. Physiologic human fluids and swelling behavior of hydrophilic biocompatible hybrid ceramo-polymeric materials. Am. J. Eng. Applied Sci., 9: 962-972. DOI: 10.3844/ajeassp.2016.962.972

Aversa, R., R.V. Petrescu, A. Apicella and F.I.T. Petrescu, 2016l. One can slow down the aging through antioxidants. Am. J. Eng. Applied Sci., 9: 1112-1126. DOI: 10.3844/ajeassp.2016.1112.1126

Aversa, R., R.V. Petrescu, A. Apicella and F.I.T. Petrescu, 2016m. About homeopathy or ≪Similia Similibus Curentur≫. Am. J. Eng. Applied Sci., 9: 1164-1172. DOI: 10.3844/ajeassp.2016.1164.1172

Aversa, R., R.V. Petrescu, A. Apicella and F.I.T. Petrescu, 2016n. The basic elements of life's. Am. J. Eng. Applied Sci., 9: 1189-1197. DOI: 10.3844/ajeassp.2016.1189.1197

Aversa, R., F.I.T. Petrescu, R.V. Petrescu and A. Apicella, 2016o. Flexible stem trabecular prostheses. Am. J. Eng. Applied Sci., 9: 1213-1221. DOI: 10.3844/ajeassp.2016.1213.122

Aversa, R., R.V.V. Petrescu, A. Apicella and F.I.T. Petrescu, 2017a. Nano-diamond hybrid materials for structural biomedical application. Am. J. Biochem. Biotechnol., 13: 34-41. DOI: 10.3844/ajbbsp.2017.34.41

Aversa, R., R.V. Petrescu, B. Akash, R.B. Bucinell and J.M. Corchado *et al*., 2017b. Kinematics and forces to a new model forging manipulator. Am. J. Applied Sci., 14: 60-80. DOI: 10.3844/ajassp.2017.60.80

Aversa, R., R.V. Petrescu, A. Apicella, F.I.T. Petrescu and J.K. Calautit *et al*., 2017c. Something about the V engines design. Am. J. Applied Sci., 14: 34-52. DOI: 10.3844/ajassp.2017.34.52

Aversa, R., D. Parcesepe, R.V.V. Petrescu, F. Berto and G. Chen *et al*., 2017d. Process ability of bulk metallic glasses. Am. J. Applied Sci., 14: 294-301. DOI: 10.3844/ajassp.2017.294.301

Aversa, R., R.V.V. Petrescu, B. Akash, R.B. Bucinell and J.M. Corchado *et al*., 2017e. Something about the balancing of thermal motors. Am. J. Eng. Applied Sci., 10: 200.217. DOI: 10.3844/ajeassp.2017.200.217

Babayemi, A.K., 2016. Thermodynamics, non-linear isotherms, statistical modeling and optimization of phosphorus adsorption from wastewater. Am. J. Eng. Applied Sci., 9: 1019-1026. DOI: 10.3844/ajeassp.2016.1019.1026

Bakar, R.A., M.K. Mohammed and M.M. Rahman, 2009. Numerical study on the performance characteristics of hydrogen fueled port injection internal combustion engine. Am. J. Eng. Applied Sci., 2: 407-415. DOI: 10.3844/ajeassp.2009.407.415

Barone, G., A. Buonomano, C. Forzano and A. Palombo, 2016. WLHP systems in commercial buildings: A case study analysis based on a dynamic simulation approach. Am. J. Eng. Applied Sci., 9: 659-668. DOI: 10.3844/ajeassp.2016.659.668

Bedon, C. and C. Amadio, 2016. A unified approach for the shear buckling design of structural glass walls with non-ideal restraints. Am. J. Eng. Applied Sci., 9: 64-78. DOI: 10.3844/ajeassp.2016.64.78

Bedon, C. and C. Louter, 2016. Finite-element numerical simulation of the bending performance of post-tensioned structural glass beams with adhesively bonded CFRP tendons. Am. J. Eng. Applied Sci., 9: 680-691. DOI: 10.3844/ajeassp.2016.680.691

Bedon, C., 2016. Review on the use of FRP composites for facades and building skins. Am. J. Eng. Applied Sci., 9: 713-723. DOI: 10.3844/ajeassp.2016.713.723

Ben-Faress, M., A., Elouadi and D., Gretete, 2019. Global Supply Chain Risk Management. Am. J. Eng. Applied Sci., 12: 147-155. DOI: 10.3844/ajeassp.2019.147.155

Bier, H. and S. Mostafavi, 2015. Structural optimization for materially informed design to robotic production processes. Am. J. Eng. Applied Sci., 8: 549-555. DOI: 10.3844/ajeassp.2015.549.555

Bolonkin, A., 2009a. Femtotechnology: Nuclear matter with fantastic properties. Am. J. Eng. Applied Sci., 2: 501-514. DOI: 10.3844/ajeassp.2009.501.514

Bolonkin, A., 2009b. Converting of matter to nuclear energy by ab-generator. Am. J. Eng. Applied Sci., 2: 683-693. DOI: 10.3844/ajeassp.2009.683.693

Boucetta, A., 2008. Vector control of a variable reluctance machine stator and rotor discs imbricates. Am. J. Eng. Applied Sci., 1: 260-265. DOI: 10.3844/ajeassp.2008.260.265

Bourahla, N. and A. Blakeborough, 2015. Similitude distortion compensation for a small scale model of a knee braced steel frame. Am. J. Eng. Applied Sci., 8: 481-488. DOI: 10.3844/ajeassp.2015.481.488

Bucinell, R.B., 2016. Stochastic model for variable amplitude fatigue induced delamination growth in graphite/epoxy laminates. Am. J. Eng. Applied Sci., 9: 635-646. DOI: 10.3844/ajeassp.2016.635.646

Budak, S., Z. Xiao, B. Johnson, J. Cole and M. Drabo *et al*., 2016. Highly-efficient advanced thermoelectric devices from different multilayer thin films. Am. J. Eng. Applied Sci., 9: 356-363. DOI: 10.3844/ajeassp.2016.356.363

Buonomano, A., F. Calise and M. Vicidomini, 2016a. A novel prototype of a small-scale solar power plant: Dynamic simulation and thermoeconomic analysis. Am. J. Eng. Applied Sci., 9: 770-788. DOI: 10.3844/ajeassp.2016.770.788

Buonomano, A., F. Calise, M.D. d'Accadia, R. Vanoli and M. Vicidomini, 2016b. Simulation and experimental analysis of a demonstrative solar heating and cooling plant installed in Naples (Italy). Am. J. Eng. Applied Sci., 9: 798-813. DOI: 10.3844/ajeassp.2016.798.813

Calise, F., M.D. dâ' Accadia, L. Libertini, E. Quiriti and M. Vicidomini, 2016b. Dynamic simulation and optimum operation strategy of a trigeneration system serving a hospital. Am. J. Eng. Applied Sci., 9: 854-867. DOI: 10.3844/ajeassp.2016.854.867

Calise, F., M.D. dâ' Accadia, L. Libertini, E. Quiriti and M. Vicidomini, 2016b. Dynamic simulation and optimum operation strategy of a trigeneration system serving a hospital. Am. J. Eng. Applied Sci., 9: 854-867. DOI: 10.3844/ajeassp.2016.854.867

Campo, T., M. Cotto, F. Marquez, E. Elizalde and C. Morant, 2016. Graphene synthesis by plasma-enhanced CVD growth with ethanol. Am. J. Eng. Applied Sci., 9: 574-583. DOI: 10.3844/ajeassp.2016.574.583

Campo, T., M. Cotto, F. Marquez, E. Elizalde and C. Morant, 2016. Graphene synthesis by plasma-enhanced CVD growth with ethanol. Am. J. Eng. Applied Sci., 9: 574-583. DOI: 10.3844/ajeassp.2016.574.583

Cao, W., H. Ding, Z. Bin and C. Ziming, 2013. New structural representation and digital-analysis platform for symmetrical parallel mechanisms. Int. J. Adv. Robotic Sys. DOI: 10.5772/56380

Cardu, M., P. Oreste and T. Cicala, 2009. Analysis of the tunnel boring machine advancement on the Bologna-Florence railway link. Am. J. Eng. Applied Sci., 2: 416-420. DOI: 10.3844/ajeassp.2009.416.420

Cardu, M., P. Oreste and T. Cicala, 2009. Analysis of the tunnel boring machine advancement on the Bologna-Florence railway link. Am. J. Eng. Applied Sci., 2: 416-420. DOI: 10.3844/ajeassp.2009.416.420

Casadei, D., 2015. Bayesian statistical inference for number counting experiments. Am. J. Eng. Applied Sci., 8: 730-735. DOI: 10.3844/ajeassp.2015.730.735

Casadei, D., 2015. Bayesian statistical inference for number counting experiments. Am. J. Eng. Applied Sci., 8: 730-735. DOI: 10.3844/ajeassp.2015.730.735

Comanescu, A., 2010. Bazele Modelarii Mecanismelor. 1st Edn., E. Politeh, Press, Bucureşti, ISBN-10: 6065151157, pp: 274.

Darabi, A., S.A. Soleamani and A. Hassannia, 2008. Fuzzy based digital automatic voltage regulator of a synchronous generator with unbalanced loads. Am. J. Eng. Applied Sci., 1: 280-286. DOI: 10.3844/ajeassp.2008.280.286

Daud, H., N. Yahya, A.A. Aziz and M.F. Jusoh, 2008. Development of wireless electric concept powering electrical appliances. Am. J. Eng. Applied Sci., 1: 12-15. DOI: 10.3844/ajeassp.2008.12.15

De León, J., M., del, C. Cotto and F., Márquez, 2019. Toxicology of Nanomaterials on Zebrafish. Am. J. Eng. Applied Sci., 12: 193-203. DOI: 10.3844/ajeassp.2019.193.203

Demetriou, D., N. Nikitas and K.D. Tsavdaridis, 2015. Semi active tuned mass dampers of buildings: A simple control option. Am. J. Eng. Applied Sci., 8: 620-632. DOI: 10.3844/ajeassp.2015.620.632

Dixit, S. and S. Pal, 2015. Synthesis and characterization of ink (Carbon)-perovskite/polyaniline ternary composite electrode for sodium chloride separation. Am. J. Eng. Applied Sci., 8: 527-537. DOI: 10.3844/ajeassp.2015.527.537

Djalel, D., M. Mourad and H. Labar, 2013. New approach of electromagnetic fields of the lightning discharge. Am. J. Eng. Applied Sci., 6: 369-383. DOI: 10.3844/ajeassp.2013.369.383

Dong, H., N. Giakoumidis, N. Figueroa and N. Mavridis, 2013. Approaching behaviour monitor and vibration indication in developing a General Moving Object Alarm System (GMOAS). Int. J. Adv. Robotic Sys. DOI: 10.5772/56586

Ebrahim, N.A., S. Ahmed, S.H.A. Rashid and Z. Taha, 2012. Technology use in the virtual R&D teams. Am. J. Eng. Applied Sci., 5: 9-14. DOI: 10.3844/ajeassp.2012.9.14

El-Labban, H.F., M. Abdelaziz and E.R.I. Mahmoud, 2013. Modification of carbon steel by laser surface melting: Part I: Effect of laser beam travelling speed on microstructural features and surface hardness. Am. J. Eng. Applied Sci., 6: 352-359. DOI: 10.3844/ajeassp.2013.352.359

Elliott, A., S. AlSalihi, A.L. Merriman and M.M. Basti, 2016. Infiltration of nanoparticles into porous binder jet printed parts. Am. J. Eng. Applied Sci., 9: 128-133. DOI: 10.3844/ajeassp.2016.128.133

Elmeddahi, Y., H. Mahmoudi, A. Issaadi, M.F.A. Goosen and R. Ragab, 2016. Evaluating the effects of climate change and variability on water resources: A case study of the Cheliff Basin in Algeria. Am. J. Eng. Applied Sci., 9: 835-845. DOI: 10.3844/ajeassp.2016.835.845

El-Tous, Y., 2008. Pitch angle control of variable speed wind turbine. Am. J. Eng. Applied Sci., 1: 118-120. DOI: 10.3844/ajeassp.2008.118.120

Faizal, A., S. Mulyono, R. Yendra and A. Fudholi, 2016. Design Maximum Power Point Tracking (MPPT) on photovoltaic panels using fuzzy logic method. Am. J. Eng. Applied Sci., 9: 789-797. DOI: 10.3844/ajeassp.2016.789.797

Farahani, A.S., N.M. Adam and M.K.A. Ariffin, 2010. Simulation of airflow and aerodynamic forces acting on a rotating turbine ventilator. Am. J. Eng. Applied Sci., 3: 159-170. DOI: 10.3844/ajeassp.2010.159.170

Farokhi, E. and M. Gordini, 2015. Investigating the parameters influencing the behavior of knee braced steel structures. Am. J. Eng. Applied Sci., 8: 567-574. DOI: 10.3844/ajeassp.2015.567.574

Fathallah, A.Z.M. and R.A. Bakar, 2009. Prediction studies for the performance of a single cylinder high speed spark ignition linier engine with spring mechanism as return cycle. Am. J. Eng. Applied Sci., 2: 713-720. DOI: 10.3844/ajeassp.2009.713.720

Fen, Y.W., W.M.M. Yunus, M.M. Moksin, Z.A. Talib and N.A. Yusof, 2011. Optical properties of crosslinked chitosan thin film with glutaraldehyde using surface plasmon resonance technique. Am. J. Eng. Applied Sci., 4: 61-65. DOI: 10.3844/ajeassp.2011.61.65

Feraga, C.E., A. Moussaoui, A. Bouldjedri and A. Yousfi, 2009. Robust position controller for a permanent magnet synchronous actuator. Am. J. Eng. Applied Sci., 2: 388-392. DOI: 10.3844/ajeassp.2009.388.392

Fontánez, K., A., García, M., del, C. Cotto-Maldonado and J., Duconge et al., 2019. Development of ionizing radiation sensors based on carbon nanotubes. Am. J. Eng. Applied Sci., 12: 185-192. DOI: 10.3844/ajeassp.2019.185.192

Franklin, D.J., 1930. Ingenious Mechanisms for Designers and Inventors. 1st Edn., Industrial Press, ISBN-10: 0831110325, pp: 486.

Fu, Y.F., J. Gong, H. Huang, Y.J. Liu and D. Zhu *et al*., 2015. Parameters optimization of adaptive cashew shelling cutter based on BP neural network and genetic algorithm. Am. J. Eng. Applied Sci., 8: 648-658. DOI: 10.3844/ajeassp.2015.648.658

Ge, L. and X. Xu, 2015. A scheme design of cloud + end technology in demand side management. Am. J. Eng. Applied Sci., 8: 736-747. DOI: 10.3844/ajeassp.2015.736.747

Gupta, P., A. Gupta and A. Asati, 2015. Ultra low power MUX based compressors for wallace and dadda multipliers in sub-threshold regime. Am. J. Eng. Applied Sci., 8: 702-716. DOI: 10.3844/ajeassp.2015.702.716

Gusti, A.P. and Semin, 2016. The effect of vessel speed on fuel consumption and exhaust gas emissions. Am. J. Eng. Applied Sci., 9: 1046-1053. DOI: 10.3844/ajeassp.2016.1046.1053

Hasan, S. and M.H. El-Naas, 2016. Optimization of a combined approach for the treatment of carbide slurry and capture of CO_2. Am. J. Eng. Applied Sci., 9: 449-457. DOI: 10.3844/ajeassp.2016.449.457

Hassan, M., H. Mahjoub and M. Obed, 2012. Voice-based control of a DC servo motor. Am. J. Eng. Applied Sci., 5: 89-92. DOI: 10.3844/ajeassp.2012.89.92

He, B., Z. Wang, Q. Li, H. Xie and R. Shen, 2013. An analytic method for the kinematics and dynamics of a multiple-backbone continuum robot. IJARS. DOI: 10.5772/54051

Helmy, A.K. and G.S. El-Taweel, 2010. Neural network change detection model for satellite images using textural and spectral characteristics. Am. J. Eng. Applied Sci., 3: 604-610. DOI: 10.3844/ajeassp.2010.604.610

Hirun, W., 2016. Evaluation of interregional freight generation modelling methods by using nationwide commodity flow survey data. Am. J. Eng. Applied Sci., 9: 625-634. DOI: 10.3844/ajeassp.2016.625.634

Ho, C.Y.F., B.W.K. Ling, S.G. Blasi, Z.W. Chi and W.C. Siu, 2011. Single step optimal block matched motion estimation with motion vectors having arbitrary pixel precisions. Am. J. Eng. Applied Sci., 4: 448-460. DOI: 10.3844/ajeassp.2011.448.460

Huang, B., S.H. Masood, M. Nikzad, P.R. Venugopal and A. Arivazhagan, 2016. Dynamic mechanical properties of fused deposition modelling processed polyphenylsulfone material. Am. J. Eng. Applied Sci., 9: 1-11. DOI: 10.3844/ajeassp.2016.1.11

Hypolite, B.P., W.T., Evariste and M.I., Adolphe, 2019. A 10GHZ low-offset dynamic comparator for high-speed and lower-power ADCS. Am. J. Eng. Applied Sci., 12: 156-165. DOI: 10.3844/ajeassp.2019.156.165

Idarwazeh, S., 2011. Inverse discrete Fourier transform-discrete Fourier transform techniques for generating and receiving spectrally efficient frequency division multiplexing signals. Am. J. Eng. Applied Sci., 4: 598-606. DOI: 10.3844/ajeassp.2011.598.606

Iqbal, 2016. An overview of Energy Loss Reduction (ELR) software used in Pakistan by WAPDA for calculating transformer overloading, line losses and energy losses. Am. J. Eng. Applied Sci., 9: 442-448. DOI: 10.3844/ajeassp.2016.442.448

Ismail, M.I.S., Y. Okamoto, A. Okada and Y. Uno, 2011. Experimental investigation on micro-welding of thin stainless steel sheet by fiber laser. Am. J. Eng. Applied Sci., 4: 314-320. DOI: 10.3844/ajeassp.2011.314.320

Jaber, A.A. and R. Bicker, 2016. Industrial robot fault detection based on statistical control chart. Am. J. Eng. Applied Sci., 9: 251-263. DOI: 10.3844/ajeassp.2016.251.263

Jafari, N., A. Alsadoon, C.P. Withana, A. Beg and A. Elchouemi, 2016. Designing a comprehensive security framework for smartphones and mobile devices. Am. J. Eng. Applied Sci., 9: 724-734. DOI: 10.3844/ajeassp.2016.724.734

Jalil, M.I.A. and J. Sampe, 2013. Experimental investigation of thermoelectric generator modules with different technique of cooling system. Am. J. Eng. Applied Sci., 6: 1-7. DOI: 10.3844/ajeassp.2013.1.7

Jaoude, A.A. and K. El-Tawil, 2013. Analytic and nonlinear prognostic for vehicle suspension systems. Am. J. Eng. Applied Sci., 6: 42-56. DOI: 10.3844/ajeassp.2013.42.56

Jarahi, H. and S. Seifilaleh, 2016. Rock fall hazard zonation in Haraz Highway. Am. J. Eng. Applied Sci., 9: 371-379. DOI: 10.3844/ajeassp.2016.371.379

Jarahi, H., 2016. Probabilistic seismic hazard deaggregation for Karaj City (Iran). Am. J. Eng. Applied Sci., 9: 520-529. DOI: 10.3844/ajeassp.2016.520.529

Jauhari, K., A. Widodo and I. Haryanto, 2016. Identification of a machine tool spindle critical frequency through modal and imbalance response analysis. Am. J. Eng. Applied Sci., 9: 213-221. DOI: 10.3844/ajeassp.2016.213.221

Jiang, J., Q. Chen and S. Nimbalkar, 2016. Field data based method for predicting long-term settlements. Am. J. Eng. Applied Sci., 9: 466-476. DOI: 10.3844/ajeassp.2016.466.476

Kaewnai, S. and S. Wongwises, 2011. Improvement of the runner design of Francis turbine using computational fluid dynamics. Am. J. Eng. Applied Sci., 4: 540-547. DOI: 10.3844/ajeassp.2011.540.547

Kamble, V.G. and N. Kumar, 2016. Fabrication and tensile property analysis of polymer matrix composites of graphite and silicon carbide as fillers. Am. J. Eng. Applied Sci., 9: 17-30. DOI: 10.3844/ajeassp.2016.17.30

Kazakov, V.V., V.I. Yusupov, V.N. Bagratashvili, A.I. Pavlikov and V.A. Kamensky, 2016. Control of bubble formation at the optical fiber tip by analyzing ultrasound acoustic waves. Am. J. Eng. Applied Sci., 9: 921-927. DOI: 10.3844/ajeassp.2016.921.927

Kechiche, O.B.H.B., H.B.A. Sethom, H. Sammoud and I.S. Belkhodja, 2011. Optimized high-frequency signal injection based permanent magnet synchronous motor rotor position estimation applied to washing machines. Am. J. Eng. Applied Sci., 4: 390-399. DOI: 10.3844/ajeassp.2011.390.399

Khalifa, A.H.N., A.H. Jabbar and J.A. Muhsin, 2015. Effect of exhaust gas temperature on the performance of automobile adsorption air-conditioner. Am. J. Eng. Applied Sci., 8: 575-581. DOI: 10.3844/ajeassp.2015.575.581

Khalil, R., 2015. Credibility of 3D volume computation using GIS for pit excavation and roadway constructions. Am. J. Eng. Applied Sci., 8: 434-442. DOI: 10.3844/ajeassp.2015.434.442

Kuli, I., T.M. Abu-Lebdeh, E.H. Fini and S.A. Hamoush, 2016. The use of nano-silica for improving mechanical properties of hardened cement paste. Am. J. Eng. Applied Sci., 9: 146-154. DOI: 10.3844/ajeassp.2016.146.154

Kumar, N.D., R.D. Ravali and PR. Srirekha, 2015. Design and realization of pre-amplifier and filters for on-board radar system. Am. J. Eng. Applied Sci., 8: 689-701. DOI: 10.3844/ajeassp.2015.689.701

Kunanoppadon, J., 2010. Thermal efficiency of a combined turbocharger set with gasoline engine. Am. J. Eng. Applied Sci., 3: 342-349. DOI: 10.3844/ajeassp.2010.342.349

Kwon, S., Y. Tani, H. Okubo and T. Shimomura, 2010. Fixed-star tracking attitude control of spacecraft using single-gimbal control moment gyros. Am. J. Eng. Applied Sci., 3: 49-55. DOI: 10.3844/ajeassp.2010.49.55

Lamarre, A., E.H. Fini and T.M. Abu-Lebdeh, 2016. Investigating effects of water conditioning on the adhesion properties of crack sealant. Am. J. Eng. Applied Sci., 9: 178-186. DOI: 10.3844/ajeassp.2016.178.186

Lee, B.J., 2013. Geometrical derivation of differential kinematics to calibrate model parameters of flexible manipulator. Int. J. Adv. Robotic Sys. DOI: 10.5772/55592

Li, R., B. Zhang, S. Xiu, H. Wang and L. Wang *et al*., 2015. Characterization of solid residues obtained from supercritical ethanol liquefaction of swine manure. Am. J. Eng. Applied Sci., 8: 465- 470. DOI: 10.3844/ajeassp.2015.465.470

Lin, W., B. Li, X. Yang and D. Zhang, 2013. Modelling and control of inverse dynamics for a 5-DOF parallel kinematic polishing machine. Int. J. Adv. Robotic Sys. DOI: 10.5772/54966

Liu, H., W. Zhou, X. Lai and S. Zhu, 2013. An efficient inverse kinematic algorithm for a PUMA560-structured robot manipulator. IJARS. DOI: 10.5772/56403

Lubis, Z., A.N. Abdalla, Mortaza and R. Ghon, 2009. Mathematical modeling of the three phase induction motor couple to DC motor in hybrid electric vehicle. Am. J. Eng. Applied Sci., 2: 708-712. DOI: 10.3844/ajeassp.2009.708.712

Madani, D.A. and A. Dababneh, 2016. Rapid entire body assessment: A literature review. Am. J. Eng. Applied Sci., 9: 107-118. DOI: 10.3844/ajeassp.2016.107.118

Malomar, G.E.B., A. Gueye, C. Mbow, V.B. Traore and A.C. Beye, 2016. Numerical study of natural convection in a square porous cavity thermally modulated on both side walls. Am. J. Eng. Applied Sci., 9: 591-598. DOI: 10.3844/ajeassp.2016.591.598

Mansour, M.A.A., 2016. Developing an anthropometric database for Saudi students and comparing Saudi dimensions relative to Turkish and Iranian peoples. Am. J. Eng. Applied Sci., 9: 547-557. DOI: 10.3844/ajeassp.2016.547.557

Maraveas, C., Z.C. Fasoulakis and K.D. Tsavdaridis, 2015. A review of human induced vibrations on footbridges. Am. J. Eng. Applied Sci., 8: 422-433. DOI: 10.3844/ajeassp.2015.422.433

Marghany, M. and M. Hashim, 2009. Robust of doppler centroid for mapping sea surface current by using radar satellite data. Am. J. Eng. Applied Sci., 2: 781-788. DOI: 10.3844/ajeassp.2009.781.788

Martins, F.R., A.R. Gonçalves and E.B. Pereira, 2016. Observational study of wind shear in northeastern Brazil. Am. J. Eng. Applied Sci., 9: 484-504. DOI: 10.3844/ajeassp.2016.484.504

Marzuki, M.A.L.B., M.H. Abd Halim and A.R.N. Mohamed, 2015. Determination of natural frequencies through modal and harmonic analysis of space frame race car chassis based on ANSYS. Am. J. Eng. Applied Sci., 8: 538-548. DOI: 10.3844/ajeassp.2015.538.548

Mavukkandy, M.O., S. Chakraborty, T. Abbasi and S.A. Abbasi, 2016. A clean-green synthesis of platinum nanoparticles utilizing a pernicious weed lantana (Lantana Camara). Am. J. Eng. Applied Sci., 9: 84-90. DOI: 10.3844/ajeassp.2016.84.90

Minghini, F., N. Tullini and F. Ascione, 2016. Updating Italian design guide CNR DT-205/2007 in view of recent research findings: Requirements for pultruded FRP profiles. Am. J. Eng. Applied Sci., 9: 702-712. DOI: 10.3844/ajeassp.2016.702.712

Moezi, N., D. Dideban and A. Ketabi, 2008. A novel integrated SET based inverter for nano power electronic applications. Am. J. Eng. Applied Sci., 1: 219-222. DOI: 10.3844/ajeassp.2008.219.222

Mohamed, M.A., A.Y. Tuama, M. Makhtar, M.K. Awang and M. Mamat, 2016. The effect of RSA exponential key growth on the multi-core computational resource. Am. J. Eng. Applied Sci., 9: 1054-1061. DOI: 10.3844/ajeassp.2016.1054.1061

Mohan, K.S.R., P. Jayabalan and A. Rajaraman, 2012. Properties of fly ash based coconut fiber composite. Am. J. Eng. Applied Sci., 5: 29-34. DOI: 10.3844/ajeassp.2012.29.34

Mohseni, E. and K.D. Tsavdaridis, 2016. Effect of nano-alumina on pore structure and durability of class f fly ash self-compacting mortar. Am. J. Eng. Applied Sci., 9: 323-333. DOI: 10.3844/ajeassp.2016.323.333

Momani, M.A., T.A. Al Smadi, FM. Al Taweel and K.A. Ghaidan, 2011. GPS ionospheric total electron content and scintillation measurements during the October 2003 magnetic storm. Am. J. Eng. Applied Sci., 4: 301-306. DOI: 10.3844/ajeassp.2011.301.306

Momta, P.S., J.O. Omoboh and M.I. Odigi, 2015. Sedimentology and depositional environment of D2 sand in part of greater ughelli depobelt, onshore Niger Delta, Nigeria. Am. J. Eng. Applied Sci., 8: 556-566. DOI: 10.3844/ajeassp.2015.556.566

Mondal, R., S. Sahoo and C.S. Rout, 2016. Mixed nickel cobalt manganese oxide nanorods for supercapacitor application. Am. J. Eng. Applied Sci., 9: 540-546. DOI: 10.3844/ajeassp.2016.540.546

Montgomery, J., T.M. Abu-Lebdeh, S.A. Hamoush and M. Picornell, 2016. Effect of nano-silica on the compressive strength of harden cement paste at different stages of hydration. Am. J. Eng. Applied Sci., 9: 166-177. DOI: 10.3844/ajeassp.2016.166.177

Moretti, M.L., 2015. Seismic design of masonry and reinforced concrete infilled frames: A comprehensive overview. Am. J. Eng. Applied Sci., 8: 748-766. DOI: 10.3844/ajeassp.2015.748.766

Morse, A., M.M. Mansfield, R.M. Alley, H.A. Kerr and R.B. Bucinell, 2016b. Traction enhancing products affect maximum torque at the shoe-floor interface: A potential increased risk of ACL injury. Am. J. Eng. Applied Sci., 9: 889-893. DOI: 10.3844/ajeassp.2016.889.893

Moubarek, T. and A. Gharsallah, 2016. A six-port reflectometer calibration using Wilkinson power divider. Am. J. Eng. Applied Sci., 9: 274-280. DOI: 10.3844/ajeassp.2016.274.280

Nabilou, A., 2016a. Effect of parameters of selection and replacement drilling bits based on geo-mechanical factors: (Case study: Gas and oil reservoir in the Southwest of Iran). Am. J. Eng. Applied Sci., 9: 380-395. DOI: 10.3844/ajeassp.2016.380.395

Nabilou, A., 2016b. Study of the parameters of Steam Assisted Gravity Drainage (SAGD) method for enhanced oil recovery in a heavy oil fractured carbonate reservoir. Am. J. Eng. Applied Sci., 9: 647-658. DOI: 10.3844/ajeassp.2016.647.658

Nachiengtai, T., W. Chim-Oye, S. Teachavorasinskun and W. Sa-Ngiamvibool, 2008. Identification of shear band using elastic shear wave propagation. Am. J. Eng. Applied Sci., 1: 188-191. DOI: 10.3844/ajeassp.2008.188.191

Nahas, R. and S.P. Kozaitis, 2014. Metric for the fusion of synthetic and real imagery from multimodal sensors. Am. J. Eng. Applied Sci., 7: 355-362. DOI: 10.3844/ajeassp.2014.355.362

Nandhakumar, S., V. Selladurai and S. Sekar, 2009. Numerical investigation of an industrial robot arm control problem using haar wavelet series. Am. J. Eng. Applied Sci., 2: 584-589. DOI: 10.3844/ajeassp.2009.584.589

Ng, K.C., M.Z. Yusoff, K. Munisamy, H. Hasini and N.H. Shuaib, 2008. Time-marching method for computations of high-speed compressible flow on structured and unstructured grid. Am. J. Eng. Applied Sci., 1: 89-94. DOI: 10.3844/ajeassp.2008.89.94

Obaiys, S.J., Z. Abbas, N.M.A. Nik Long, A.F. Ahmad and A. Ahmedov *et al*., 2016. On the general solution of first-kind hypersingular integral equations. Am. J. Eng. Applied Sci., 9: 195-201. DOI: 10.3844/ajeassp.2016.195.201

Odeh, S., R. Faqeh, L. Abu Eid and N. Shamasneh, 2009. Vision-based obstacle avoidance of mobile robot using quantized spatial model. Am. J. Eng. Applied Sci., 2: 611-619. DOI: 10.3844/ajeassp.2009.611.619

Ong, A.T., A. Mustapha, Z.B. Ibrahim, S. Ramli and B.C. Eong, 2015. Real-time automatic inspection system for the classification of PCB flux defects. Am. J. Eng. Applied Sci., 8: 504-518. DOI: 10.3844/ajeassp.2015.504.518

Opafunso, Z.O., I.I. Ozigis and I.A. Adetunde, 2009. Pneumatic and hydraulic systems in coal fluidized bed combustor. Am. J. Eng. Applied Sci., 2: 88-95. DOI: 10.3844/ajeassp.2009.88.95

Orlando, N. and E. Benvenuti, 2016. Advanced XFEM simulation of pull-out and debonding of steel bars and FRP-reinforcements in concrete beams. Am. J. Eng. Applied Sci., 9: 746-754. DOI: 10.3844/ajeassp.2016.746.754

Padula, F. and V. Perdereau, 2013. An on-line path planner for industrial manipulators. Int. J. Adv. Robotic Sys. DOI: 10.5772/55063

Pannirselvam, N., P.N. Raghunath and K. Suguna, 2008. Neural network for performance of glass fibre reinforced polymer plated RC beams. Am. J. Eng. Applied Sci., 1: 82-88. DOI: 10.3844/ajeassp.2008.82.88

Pattanasethanon, S., 2010. The solar tracking system by using digital solar position sensor. Am. J. Eng. Applied Sci., 3: 678-682. DOI: 10.3844/ajeassp.2010.678.682

Pérez-de León, G., V.E. Lamberti, R.D. Seals, T.M. Abu-Lebdeh and S.A. Hamoush, 2016. Gas atomization of molten metal: Part I. Numerical modeling conception. Am. J. Eng. Applied Sci., 9: 303-322. DOI: 10.3844/ajeassp.2016.303.322

Perumaal, S. and N. Jawahar, 2013. Automated trajectory planner of industrial robot for pick-and-place task. IJARS. DOI: 10.5772/53940

Petrescu, F. and R. Petrescu, 1995a. Contributions to optimization of the polynomial motion laws of the stick from the internal combustion engine distribution mechanism. Bucharest, 1: 249-256.

Petrescu, F. and R. Petrescu, 1995b. Contributions to the synthesis of internal combustion engine distribution mechanisms. Bucharest, 1: 257-264.

Petrescu, F. and R. Petrescu, 1997a. Dynamics of cam mechanisms (exemplified on the classic distribution mechanism). Bucharest, 3: 353-358.

Petrescu, F. and R. Petrescu, 1997b. Contributions to the synthesis of the distribution mechanisms of internal combustion engines with a Cartesian coordinate method. Bucharest, 3: 359-364.

Petrescu, F. and R. Petrescu, 1997c. Contributions to maximizing polynomial laws for the active stroke of the distribution mechanism from internal combustion engines. Bucharest, 3: 365-370.

Petrescu, F. and R. Petrescu, 2000a. Synthesis of distribution mechanisms by the rectangular (Cartesian) coordinate method. Proceedings of the 8th National Conference on International Participation, (CIP' 00), Craiova, Romania, pp: 297-302.

Petrescu, F. and R. Petrescu, 2000b. The design (synthesis) of cams using the polar coordinate method (triangle method). Proceedings of the 8th National Conference on International Participation, (CIP' 00), Craiova, Romania, pp: 291-296.

Petrescu, F. and R. Petrescu, 2002a. Motion laws for cams. Proceedings of the International Computer Assisted Design, National Symposium with Participation, (SNP' 02), Braşov, pp: 321-326.

Petrescu, F. and R. Petrescu, 2002b. Camshaft dynamics elements. Proceedings of the International Computer Assisted Design, National Participation Symposium, (SNP' 02), Braşov, pp: 327-332.

Petrescu, F. and R. Petrescu, 2003. Some elements regarding the improvement of the engine design. Proceedings of the National Symposium, Descriptive Geometry, Technical Graphics and Design, (GTD' 03), Braşov, pp: 353-358.

Petrescu, F. and R. Petrescu, 2005a. The cam design for a better efficiency. Proceedings of the International Conference on Engineering Graphics and Design, (EGD' 05), Bucharest, pp: 245-248.

Petrescu, F. and R. Petrescu, 2005b. Contributions at the dynamics of cams. Proceedings of the 9th IFToMM International Symposium on Theory of Machines and Mechanisms, (TMM' 05), Bucharest, Romania, pp: 123-128.

Petrescu, F. and R. Petrescu, 2005c. Determining the dynamic efficiency of cams. Proceedings of the 9th IFToMM International Symposium on Theory of Machines and Mechanisms, (TMM' 05), Bucharest, Romania, pp: 129-134.

Petrescu, F. and R. Petrescu, 2005d. An original internal combustion engine. Proceedings of the 9th IFToMM International Symposium on Theory of Machines and Mechanisms, (TMM' 05), Bucharest, Romania, pp: 135-140.

Petrescu, F. and R. Petrescu, 2005e. Determining the mechanical efficiency of Otto engine's mechanism. Proceedings of the 9th IFToMM International Symposium on Theory of Machines and Mechanisms, (TMM 05), Bucharest, Romania, pp: 141-146.

Petrescu, F.I. and R.V. Petrescu, 2011a. Mechanical Systems, Serial and Parallel (Romanian). 1st Edn., LULU Publisher, London, UK, pp: 124.

Petrescu, F.I.T. and RV. Petrescu, 2011b. Trenuri Planetare. 1st Edn., Createspace Independent Pub., ISBN-13: 978-1468030419, pp: 104.

Petrescu, F.I. and R.V. Petrescu, 2012a. Kinematics of the planar quadrilateral mechanism. ENGEVISTA, 14: 345-348.

Petrescu, F.I. and R.V. Petrescu, 2012b. Mecatronica-Sisteme Seriale si Paralele. 1st Edn., Create Space, USA, ISBN-10: 1495923819, pp: 128.

Petrescu, F.I. and R.V. Petrescu, 2013a. Cinematics of the 3R dyad. ENGEVISTA, 15: 118-124.

Petrescu, F.I.T. and R.V. Petrescu, 2013b. Forces and efficiency of cams. Int. Rev. Mech. Eng., 7: 507-511.

Petrescu, F.I.T. and R.V. Petrescu, 2013c. Cams with high efficiency. Int. Rev. Mech. Eng., 7: 599-606.

Petrescu, F.I.T. and R.V. Petrescu, 2013d. An algorithm for setting the dynamic parameters of the classic distribution mechanism. Int. Rev. Modell. Simulat., 6: 1637-1641.

Petrescu, F.I.T. and R.V. Petrescu, 2013e. Dynamic synthesis of the rotary cam and translated tappet with roll. Int. Rev. Modell. Simulat., 6: 600-607.

Petrescu, F.I.T. and R.V. Petrescu, 2014a. Parallel moving mechanical systems. Independent J. Manage. Product., 5: 564-580.

Petrescu, F.I.T. and R.V. Petrescu, 2014b. Cam gears dynamics in the classic distribution. Independent J. Manage. Product., 5: 166-185.

Petrescu, F.I.T. and R.V. Petrescu, 2014c. High-efficiency gears synthesis by avoid the interferences. Independent J. Manage. Product., 5: 275-298.

Petrescu, F.I.T. and R.V. Petrescu, 2014d. Gear design. J. ENGEVISTA, 16: 313-328.

Petrescu, F.I.T. and R.V. Petrescu, 2014e. Kinetostatic of the 3R dyad (or 2R module). J. ENGEVISTA, 16: 314-321.

Petrescu, F.I.T. and R.V. Petrescu, 2014f. Balancing Otto engines. Int. Rev. Mech. Eng., 8: 473-480.

Petrescu, F.I.T. and R.V. Petrescu, 2014g. Machine equations to the classical distribution. Int. Rev. Mech. Eng., 8: 309-316.

Petrescu, F.I.T. and R.V. Petrescu, 2014h. Forces of internal combustion heat engines. Int. Rev. Modell. Simulat., 7: 206-212.

Petrescu, F.I.T. and R.V. Petrescu, 2014i. Determination of the yield of internal combustion thermal engines. Int. Rev. Mech. Eng., 8: 62-67.

Petrescu, F.I.T. and R.V. Petrescu, 2015a. Forces at the main mechanism of a railbound forging manipulator. Independent J. Manage. Product., 6: 904-921.

Petrescu, F.I.T. and R.V. Petrescu, 2015b. Kinematics at the main mechanism of a railbound forging manipulator. Independent J. Manage. Product., 6: 711-729.

Petrescu, F.I.T. and R.V. Petrescu, 2015c. Machine motion equations. Independent J. Manage. Product., 6: 773-802.

Petrescu F.I.T. and R.V. Petrescu, 2015d. Presenting a railbound forging manipulator. Applied Mech. Mater., 762: 219-224.

Petrescu, F.I.T. and R.V. Petrescu, 2015e. About the anthropomorphic robots. J. ENGEVISTA, 17: 1-15.

Petrescu, F.I.T., 2015a. Geometrical synthesis of the distribution mechanisms. Am. J. Eng. Applied Sci., 8: 63-81. DOI: 10.3844/ajeassp.2015.63.81

Petrescu, F.I.T., 2015b. Machine motion equations at the internal combustion heat engines. Am. J. Eng. Applied Sci., 8: 127-137. DOI: 10.3844/ajeassp.2015.127.137

Petrescu, F.I.T., 2015c. Machine motion equations at the internal combustion heat engines. SSRN.

Petrescu, F.I. and R.V. Petrescu, 2016a. Parallel moving mechanical systems kinematics. ENGEVISTA, 18: 455-491.

Petrescu, F.I. and R.V. Petrescu, 2016b. Direct and inverse kinematics to the anthropomorphic robots. ENGEVISTA, 18: 109-124.

Petrescu, F.I. and R.V. Petrescu, 2016c. Dynamic cinematic to a structure 2R. Revista Geintec-Gestao Inovacao E Tecnol., 6: 3143-3154.

Petrescu, F.I.T. and R.V. Petrescu, 2016d. An Otto engine dynamic model. Independent J. Manage. Product., 7: 038-048.

Petrescu, R.V., R. Aversa, B. Akash, R. Bucinell and J. Corchado *et al*., 2017a. Yield at thermal engines internal combustion. Am. J. Eng. Applied Sci., 10: 243-251. DOI: 10.3844/ajeassp.2017.243.251

Petrescu, R.V., R. Aversa, B. Akash, B. Ronald and J. Corchado *et al*., 2017b. Velocities and accelerations at the 3R mechatronic systems. Am. J. Eng. Applied Sci., 10: 252-263. DOI: 10.3844/ajeassp.2017.252.263

Petrescu, R.V., R. Aversa, B. Akash, R. Bucinell and J. Corchado *et al*., 2017c. Anthropomorphic solid structures n-r kinematics. Am. J. Eng. Applied Sci., 10: 279-291. DOI: 10.3844/ajeassp.2017.279.291

Petrescu, R.V., R. Aversa, B. Akash, R. Bucinell and J. Corchado *et al*., 2017d. Inverse kinematics at the anthropomorphic robots, by a trigonometric method. Am. J. Eng. Applied Sci., 10: 394-411. DOI: 10.3844/ajeassp.2017.394.411

Petrescu, R.V., R. Aversa, B. Akash, R. Bucinell and J. Corchado *et al*., 2017e. Forces at internal combustion engines. Am. J. Eng. Applied Sci., 10: 382-393. DOI: 10.3844/ajeassp.2017.382.393

Petrescu, R.V., R. Aversa, B. Akash, R. Bucinell and J. Corchado *et al*., 2017f. Gears-Part I. Am. J. Eng. Applied Sci., 10: 457-472. DOI: 10.3844/ajeassp.2017.457.472

Petrescu, R.V., R. Aversa, B. Akash, R. Bucinell and J. Corchado *et al*., 2017g. Gears-part II. Am. J. Eng. Applied Sci., 10: 473-483. DOI: 10.3844/ajeassp.2017.473.483

Petrescu, R.V., R. Aversa, B. Akash, R. Bucinell and J. Corchado *et al*., 2017h. Cam-gears forces, velocities, powers and efficiency. Am. J. Eng. Applied Sci., 10: 491-505. DOI: 10.3844/ajeassp.2017.491.505

Petrescu, R.V., R. Aversa, B. Akash, R. Bucinell and J. Corchado *et al*., 2017i. Dynamics of mechanisms with cams illustrated in the classical distribution. Am. J. Eng. Applied Sci., 10: 551-567. DOI: 10.3844/ajeassp.2017.551.567

Petrescu, R.V., R. Aversa, B. Akash, R. Bucinell and J. Corchado *et al*., 2017j. Testing by non-destructive control. Am. J. Eng. Applied Sci., 10: 568-583. DOI: 10.3844/ajeassp.2017.568.583

Petrescu, R.V., R. Aversa, A. Apicella and F.I.T. Petrescu, 2017k. Transportation engineering. Am. J. Eng. Applied Sci., 10: 685-702. DOI: 10.3844/ajeassp.2017.685.702

Petrescu, R.V., R. Aversa, S. Kozaitis, A. Apicella and F.I.T. Petrescu, 2017l. The quality of transport and environmental protection, part I. Am. J. Eng. Applied Sci., 10: 738-755. DOI: 10.3844/ajeassp.2017.738.755

Petrescu, R.V., R. Aversa, B. Akash, R. Bucinell and J. Corchado *et al*., 2017m. Modern propulsions for aerospace-a review. J. Aircraft Spacecraft Technol., 1: 1-8. DOI: 10.3844/jastsp.2017.1.8

Petrescu, R.V., R. Aversa, B. Akash, R. Bucinell and J. Corchado *et al*., 2017n. Modern propulsions for aerospace-part II. J. Aircraft Spacecraft Technol., 1: 9-17. DOI: 10.3844/jastsp.2017.9.17

Petrescu, R.V., R. Aversa, B. Akash, R. Bucinell and J. Corchado *et al*., 2017o. History of aviation-a short review. J. Aircraft Spacecraft Technol., 1: 30-49. DOI: 10.3844/jastsp.2017.30.49

Petrescu, R.V., R. Aversa, B. Akash, R. Bucinell and J. Corchado *et al*., 2017p. Lockheed martin-a short review. J. Aircraft Spacecraft Technol., 1: 50-68. DOI: 10.3844/jastsp.2017.50.68

Petrescu, R.V., R. Aversa, B. Akash, J. Corchado and F. Berto *et al*., 2017q. Our universe. J. Aircraft Spacecraft Technol., 1: 69-79. DOI: 10.3844/jastsp.2017.69.79

Petrescu, R.V., R. Aversa, B. Akash, J. Corchado and F. Berto *et al*., 2017r. What is a UFO? J. Aircraft Spacecraft Technol., 1: 80-90. DOI: 10.3844/jastsp.2017.80.90

Petrescu, R.V., R. Aversa, B. Akash, J. Corchado and F. Berto *et al*., 2017s. About bell helicopter FCX-001 concept aircraft-a short review. J. Aircraft Spacecraft Technol., 1: 91-96. DOI: 10.3844/jastsp.2017.91.96

Petrescu, R.V., R. Aversa, B. Akash, J. Corchado and F. Berto *et al*., 2017t. Home at airbus. J. Aircraft Spacecraft Technol., 1: 97-118. DOI: 10.3844/jastsp.2017.97.118

Petrescu, R.V., R. Aversa, B. Akash, J. Corchado and F. Berto *et al*., 2017u. Airlander. J. Aircraft Spacecraft Technol., 1: 119-148. DOI: 10.3844/jastsp.2017.119.148

Petrescu, R.V., R. Aversa, B. Akash, J. Corchado and F. Berto *et al*., 2017v. When boeing is dreaming-a review. J. Aircraft Spacecraft Technol., 1: 149-161. DOI: 10.3844/jastsp.2017.149.161

Petrescu, R.V., R. Aversa, B. Akash, J. Corchado and F. Berto *et al*., 2017w. About Northrop Grumman. J. Aircraft Spacecraft Technol., 1: 162-185. DOI: 10.3844/jastsp.2017.162.185

Petrescu, R.V., R. Aversa, B. Akash, J. Corchado and F. Berto *et al*., 2017x. Some special aircraft. J. Aircraft Spacecraft Technol., 1: 186-203. DOI: 10.3844/jastsp.2017.186.203

Petrescu, R.V., R. Aversa, B. Akash, J. Corchado and F. Berto *et al*., 2017y. About helicopters. J. Aircraft Spacecraft Technol., 1: 204-223. DOI: 10.3844/jastsp.2017.204.223

Petrescu, R.V., R. Aversa, B. Akash, F. Berto and A. Apicella *et al*., 2017z. The modern flight. J. Aircraft Spacecraft Technol., 1: 224-233. DOI: 10.3844/jastsp.2017.224.233

Petrescu, R.V., R. Aversa, B. Akash, F. Berto and A. Apicella *et al*., 2017aa. Sustainable energy for aerospace vessels. J. Aircraft Spacecraft Technol., 1: 234-240. DOI: 10.3844/jastsp.2017.234.240

Petrescu, R.V., R. Aversa, B. Akash, F. Berto and A. Apicella *et al*., 2017ab. Unmanned helicopters. J. Aircraft Spacecraft Technol., 1: 241-248. DOI: 10.3844/jastsp.2017.241.248

Petrescu, R.V., R. Aversa, B. Akash, F. Berto and A. Apicella *et al*., 2017ac. Project HARP. J. Aircraft Spacecraft Technol., 1: 249-257. DOI: 10.3844/jastsp.2017.249.257

Petrescu, R.V., R. Aversa, B. Akash, F. Berto and A. Apicella *et al*., 2017ad. Presentation of Romanian engineers who contributed to the development of global aeronautics-part I. J. Aircraft Spacecraft Technol., 1: 258-271. DOI: 10.3844/jastsp.2017.258.271

Petrescu, R.V., R. Aversa, B. Akash, F. Berto and A. Apicella *et al*., 2017ae. A first-class ticket to the planet mars, please. J. Aircraft Spacecraft Technol., 1: 272-281. DOI: 10.3844/jastsp.2017.272.281

Petrescu, R.V.V., A. Raffaella and S. Kozaitis, 2017af. Some Basic Reactions in Nuclear Fusion, SSRN. Am. J. Eng. Applied Sci., 10: 709-716. DOI: 10.3844/ajeassp.2017.703.708

Petrescu, R.V.V., R. Aversa, S. Kozaitis, A. Apicella and F.I. Petrescu 2017ag. Deuteron dimensions. SSRN.

Petrescu, R.V.V., R. Aversa, S. Kozaitis, Antonio Apicella and F.I. Petrescu, 2017ah. Some Proposed Solutions to Achieve Nuclear Fusion, SSRN. Am. J. Eng. Applied Sci., 10: 709-716. DOI: 10.3844/ajeassp.2017.703.708

Petrescu, R.V.V., R. Aversa, B. Akash and F. Berto, 2017ai. Dynamic elements at MP3R. SSRN.

Petrescu, R.V., R. Aversa, A. Apicella, T. Abu-Lebdeh and F.I. Petrescu, 2017aj. Nikola Tesla. SSRN.

Petrescu, F.I., B. Grecu, A. Comanescu and R.V. Petrescu, 2009. Some mechanical design elements. Proceeding of the International Conference on Computational Mechanics and Virtual Engineering, (MVE' 09), Braşov, pp: 520-525.

Petrescu, F.I.T., 2011. Teoria Mecanismelor si a Masinilor: Curs Si Aplicatii. 1st Edn., CreateSpace Independent Publishing Platform. ISBN-10: 1468015826. pp: 432.

Petrescu, F.I.T., 2018a. Dynamic models of rigid memory mechanisms. SSRN. Am. J. Eng. Applied Sci., 11: 1242-1257. DOI: 10.3844/ajeassp.2018.1242.1257

Petrescu, F.I.T., 2018b. About the triton structure. SSRN. Am. J. Eng. Applied Sci., 11: 1293.1297

Petrescu, N. and F.I.T. Petrescu, 2018a. Elementary structure of matter can be studied with new quantum.

Petrescu, N. and F.I.T. Petrescu, 2018b. Geometric-cinematic synthesis of planetary mechanisms. SSRN.

Petrescu, R.V., R. Aversa, A. Apicella, M.M. Mirsayar and S. Kozaitis *et al*., 2018a. NASA started a propeller set on board voyager 1 after 37 years of break. Am. J. Eng. Applied Sci., 11: 66-77. DOI: 10.3844/ajeassp.2018.66.77

Petrescu, R.V., R. Aversa, A. Apicella, M.M. Mirsayar and S. Kozaitis *et al*., 2018b. There is life on mars? Am. J. Eng. Applied Sci., 11: 78-91. DOI: 10.3844/ajeassp.2018.78.91

Petrescu, R.V., R. Aversa, A. Apicella and F.I.T. Petrescu, 2018c. Friendly environmental transport. Am. J. Eng. Applied Sci., 11: 154-165. DOI: 10.3844/ajeassp.2018.154.165

Petrescu, R.V., R. Aversa, B. Akash, T.M. Abu-Lebdeh and A. Apicella *et al*., 2018d. Buses running on gas. Am. J. Eng. Applied Sci., 11: 186-201. DOI: 10.3844/ajeassp.2018.186.201

Petrescu, R.V., R. Aversa, B. Akash, T.M. Abu-Lebdeh and A. Apicella *et al*., 2018e. Some aspects of the structure of planar mechanisms. Am. J. Eng. Applied Sci., 11: 245-259. DOI: 10.3844/ajeassp.2018.245.259

Petrescu, R.V., R. Aversa, T.M. Abu-Lebdeh, A. Apicella and F.I.T. Petrescu, 2018f. The forces of a simple carrier manipulator. Am. J. Eng. Applied Sci., 11: 260-272. DOI: 10.3844/ajeassp.2018.260.272

Petrescu, R.V., R. Aversa, T.M. Abu-Lebdeh, A. Apicella and F.I.T. Petrescu, 2018g. The dynamics of the otto engine. Am. J. Eng. Applied Sci., 11: 273-287. DOI: 10.3844/ajeassp.2018.273.287

Petrescu, R.V., R. Aversa, T.M. Abu-Lebdeh, A. Apicella and F.I.T. Petrescu, 2018h. NASA satellites help us to quickly detect forest fires. Am. J. Eng. Applied Sci., 11: 288-296. DOI: 10.3844/ajeassp.2018.288.296

Petrescu, R.V., R. Aversa, T.M. Abu-Lebdeh, A. Apicella and F.I.T. Petrescu, 2018i. Kinematics of a mechanism with a triad. Am. J. Eng. Applied Sci., 11: 297-308. DOI: 10.3844/ajeassp.2018.297.308

Petrescu, R.V., R. Aversa, A. Apicella and F.I.T. Petrescu, 2018j. Romanian engineering "on the wings of the wind". J. Aircraft Spacecraft Technol., 2: 1-18. DOI: 10.3844/jastsp.2018.1.18

Petrescu, R.V., R. Aversa, A. Apicella and F.I.T. Petrescu, 2018k. NASA Data used to discover eighth planet circling distant star. J. Aircraft Spacecraft Technol., 2: 19-30. DOI: 10.3844/jastsp.2018.19.30

Petrescu, R.V., R. Aversa, A. Apicella and F.I.T. Petrescu, 2018l. NASA has found the most distant black hole. J. Aircraft Spacecraft Technol., 2: 31-39. DOI: 10.3844/jastsp.2018.31.39

Petrescu, R.V., R. Aversa, A. Apicella and F.I.T. Petrescu, 2018m. Nasa selects concepts for a new mission to titan, the moon of saturn. J. Aircraft Spacecraft Technol., 2: 40-52. DOI: 10.3844/jastsp.2018.40.52

Petrescu, R.V., R. Aversa, A. Apicella and F.I.T. Petrescu, 2018n. NASA sees first in 2018 the direct proof of ozone hole recovery. J. Aircraft Spacecraft Technol., 2: 53-64. DOI: 10.3844/jastsp.2018.53.64

Petrescu, R.V.V., R. Aversa, A. Apicella and F.I. Tiberiu Petrescu, 2018o. Dynamic Synthesis of a Dual-Clutch Automatic Gearboxes. SSRN.

Petrescu, R.V.V., R. Aversa, A. Apicella and F.I.T. Petrescu *et al*., 2018p. Dynamic synthesis of a classic, manual gearbox, SSRN,

Petrescu, R.V.V., R. Aversa and T.M. Abu-Lebdeh, 2018q. The dynamics of the Otto engine. SSRN.

Petrescu, R.V.V., R. Aversa and T.M. Abu-Lebdeh, 2018r. Kinematics of a Mechanism with a Triad SSRN. Am. J. Eng. Applied Sci., 11: 297-308. DOI: 10.3844/ajeassp.2018.297.308

Petrescu, F.I.T., T. Abu-Lebdeh and A. Apicella, 2018s. Presentation of a mechanism with a maltese cross (Geneva Driver). Am. J. Eng. Applied Sci., 11: 891-900. DOI: 10.3844/ajeassp.2018.891.900

Petrescu, F.I.T., T. Abu-Lebdeh and A. Apicella, 2018t. An Analytical Method for Determining Forces within a Triad, SSRN. Am. J. Eng. Applied Sci., 11: 901-913. DOI: 10.3844/ajeassp.2018.901.913

Petrescu, F.I.T., T. Abu-Lebdeh and A. Apicella, 2018u. Study of an Oscillating Sliding Mechanism, SSRN. Am. J. Eng. Applied Sci., 11: 870-880. DOI: 10.3844/ajeassp.2018.870.880

Petrescu, F.I.T., T. Abu-Lebdeh and A. Apicella, 2018v. Presentation of the Mechanism in the Cross, SSRN. Am. J. Eng. Applied Sci., 11: 881-890. DOI: 10.3844/ajeassp.2018.881.890

Petrescu, F.I.T., A. Apicella, A. Raffaella, R.V. Petrescu and J.K. Calautit *et al*., 2016a. Something about the mechanical moment of Inertia. Am. J. Applied Sci., 13: 1085-1090. DOI: 10.3844/ajassp.2016.1085.1090

Petrescu, R.V., R. Aversa, A. Apicella and F.I. Petrescu, 2016b. Future medicine services robotics. Am. J. Eng. Applied Sci., 9: 1062-1087. DOI: 10.3844/ajeassp.2016.1062.1087

Pisello, A.L., G. Pignatta, C. Piselli, V.L. Castaldo and F. Cotana, 2016. Investigating the dynamic thermal behavior of building envelope in summer conditions by means of in-field continuous monitoring. Am. J. Eng. Applied Sci., 9: 505-519. DOI: 10.3844/ajeassp.2016.505.519

Pourmahmoud, N., 2008. Rarefied gas flow modeling inside rotating circular cylinder. Am. J. Eng. Applied Sci., 1: 62-65. DOI: 10.3844/ajeassp.2008.62.65

Pravettoni, M., C.S.P. Lòpez and R.P. Kenny, 2016. Impact of the edges of a backside diffusive reflector on the external quantum efficiency of luminescent solar concentrators: Experimental and computational approach. Am. J. Eng. Applied Sci., 9: 53-63. DOI: 10.3844/ajeassp.2016.53.63

Qutbodin, K., 2010. Merging autopilot/flight control and navigation-flight management systems. Am. J. Eng. Applied Sci., 3: 629-630. DOI: 10.3844/ajeassp.2010.629.630

Rajbhandari, S., Z. Ghassemlooy and M. Angelova, 2011. The performance of a dual header pulse interval modulation in the presence of artificial light interferences in an indoor optical wireless communications channel with wavelet denoising. Am. J. Eng. Applied Sci., 4: 513-519. DOI: 10.3844/ajeassp.2011.513.519

Rajput, R.S., S. Pandey and S. Bhadauria, 2016. Correlation of biodiversity of algal genera with special reference to the waste water effluents from industries. Am. J. Eng. Applied Sci., 9: 1127-1133. DOI: 10.3844/ajeassp.2016.1127.1133

Rajupillai, K., S. Palaniammal and K. Bommuraju, 2015. Computational intelligence and application of frame theory in communication systems. Am. J. Eng. Applied Sci., 8: 633-637. DOI: 10.3844/ajeassp.2015.633.637

Rama, G., D. Marinkovic and M. Zehn, 2016. Efficient co-rotational 3-node shell element. Am. J. Eng. Applied Sci., 9: 420-431. DOI: 10.3844/ajeassp.2016.420.431

Raptis, K.G., G.A. Papadopoulos, T.N. Costopoulos and A.D. Tsolakis, 2011. Experimental study of load sharing in roller-bearing contact by caustics and photoelasticity. Am. J. Eng. Applied Sci., 4: 294-300. DOI: 10.3844/ajeassp.2011.294.300

Rea, P. and E. Ottaviano, 2016. Analysis and mechanical design solutions for sit-to-stand assisting devices. Am. J. Eng. Applied Sci., 9: 1134-1143. DOI: 10.3844/ajeassp.2016.1134.1143

Rhode-Barbarigos, L., V. Charpentier, S. Adriaenssens and O. Baverel, 2015. Dialectic form finding of structurally integrated adaptive structures. Am. J. Eng. Applied Sci., 8: 443-454. DOI: 10.3844/ajeassp.2015.443.454

Riccio, A., R. Cristiano and S. Saputo, 2016b. A brief introduction to the bird strike numerical simulation. Am. J. Eng. Applied Sci., 9: 946-950. DOI: 10.3844/ajeassp.2016.946.950

Riccio, A., U. Caruso, A. Raimondo and A. Sellitto, 2016a. Robustness of XFEM method for the simulation of cracks propagation in fracture mechanics problems. Am. J. Eng. Applied Sci., 9: 599-610. DOI: 10.3844/ajeassp.2016.599.610

Rich, F. and M.A. Badar, 2016. Statistical analysis of auto dilution Vs manual dilution process in inductively coupled plasma spectrometer tests. Am. J. Eng. Applied Sci., 9: 611-624. DOI: 10.3844/ajeassp.2016.611.624

Rohit, K. and S. Dixit, 2016. Mechanical properties of waste biaxially oriented polypropylene metallized films (BOPP), LLDPE: LDPE films with sisal fibres. Am. J. Eng. Applied Sci., 9: 913-920. DOI: 10.3844/ajeassp.2016.913.920

Rulkov, N.F., A.M. Hunt, P.N. Rulkov and A.G. Maksimov, 2016. Quantization of map-based neuronal model for embedded simulations of neurobiological networks in real-time. Am. J. Eng. Applied Sci., 9: 973-984. DOI: 10.3844/ajeassp.2016.973.984

Saikia, A. and N. Karak, 2016. Castor oil based epoxy/clay nanocomposite for advanced applications. Am. J. Eng. Applied Sci., 9: 31-40. DOI: 10.3844/ajeassp.2016.31.40

Sallami, A., N. Zanzouri and M. Ksouri, 2016. Robust diagnosis of a DC motor by bond graph approach. Am. J. Eng. Applied Sci., 9: 432-438. DOI: 10.3844/ajeassp.2016.432.438

Samantaray, K.S., S. Sahoo and C.S. Rout, 2016. Hydrothermal synthesis of $CuWO_4$-reduced graphene oxide hybrids and supercapacitor application. Am. J. Eng. Applied Sci., 9: 584-590. DOI: 10.3844/ajeassp.2016.584.590

Santos, F.A. and C. Bedon, 2016. Preliminary experimental and finite-element numerical assessment of the structural performance of SMA-reinforced GFRP systems. Am. J. Eng. Applied Sci., 9: 692-701. DOI: 10.3844/ajeassp.2016.692.701

Semin and R.A. Bakar, 2008. A technical review of compressed natural gas as an alternative fuel for internal combustion engines. Am. J. Eng. Applied Sci., 1: 302-311. DOI: 10.3844/ajeassp.2008.302.311

Semin, A.R.I. and R.A. Bakar, 2009a. Combustion temperature effect of diesel engine convert to compressed natural gas engine. Am. J. Eng. Applied Sci., 2: 212-216. DOI: 10.3844/ajeassp.2009.212.216

Semin, A.R.I. and R.A. Bakar, 2009b. Effect of diesel engine converted to sequential port injection compressed natural gas engine on the cylinder pressure Vs crank angle in variation engine speeds. Am. J. Eng. Applied Sci., 2: 154-159. DOI: 10.3844/ajeassp.2009.154.159

Semin S., A.R. Ismail and R.A. Bakar, 2009c. Diesel engine convert to port injection CNG engine using gaseous injector nozzle multi holes geometries improvement: A review. Am. J. Eng. Applied Sci., 2: 268-278. DOI: 10.3844/ajeassp.2009.268.278

Sepúlveda, J.A.M., 2016. Outlook of municipal solid waste in Bogota (Colombia). Am. J. Eng. Applied Sci., 9: 477-483. DOI: 10.3844/ajeassp.2016.477.483

Serebrennikov, A., D. Serebrennikov and Z. Hakimov, 2016. Polyethylene pipeline bending stresses at an installation. Am. J. Eng. Applied Sci., 9: 350-355. DOI: 10.3844/ajeassp.2016.350.355

Shanmugam, K., 2016. Flow dynamic behavior of fish oil/silver nitrate solution in mini-channel, effect of alkane addition on flow pattern and interfacial tension. Am. J. Eng. Applied Sci., 9: 236-250. DOI: 10.3844/ajeassp.2016.236.250

Shruti, 2016. Comparison in cover media under stegnography: Digital media by hide and seek approach. Am. J. Eng. Applied Sci., 9: 297-302. DOI: 10.3844/ajeassp.2016.297.302

Stavridou, N., E. Efthymiou and C.C. Baniotopoulos, 2015a. Welded connections of wind turbine towers under fatigue loading: Finite element analysis and comparative study. Am. J. Eng. Applied Sci., 8: 489-503. DOI: 10.3844/ajeassp.2015.489.503

Stavridou, N., E. Efthymiou and C.C. Baniotopoulos, 2015b. Verification of anchoring in foundations of wind turbine towers. Am. J. Eng. Applied Sci., 8: 717-729. DOI: 10.3844/ajeassp.2015.717.729

Suarez, L., T.M. Abu-Lebdeh, M. Picornell and S.A. Hamoush, 2016. Investigating the role of fly ash and silica fume in the cement hydration process. Am. J. Eng. Applied Sci., 9: 134-145. DOI: 10.3844/ajeassp.2016.134.145

Syahrullah, O.I. and N. Sinaga, 2016. Optimization and prediction of motorcycle injection system performance with feed-forward back-propagation method Artificial Neural Network (ANN). Am. J. Eng. Applied Sci., 9: 222-235. DOI: 10.3844/ajeassp.2016.222.235

Sylvester, O., I. Bibobra and O. Augustina, 2015b. Report on the evaluation of Ugua J2 and J3 reservoir performance. Am. J. Eng. Applied Sci., 8: 678-688. DOI: 10.3844/ajeassp.2015.678.688

Sylvester, O., I. Bibobra and O.N. Ogbon, 2015a. Well test and PTA for reservoir characterization of key properties. Am. J. Eng. Applied Sci., 8: 638-647. DOI: 10.3844/ajeassp.2015.638.647

Taher, S.A., R. Hematti and M. Nemati, 2008. Comparison of different control strategies in GA-based optimized UPFC controller in electric power systems. Am. J. Eng. Applied Sci., 1: 45-52. DOI: 10.3844/ajeassp.2008.45.52

Takeuchi, T., Y. Kinouchi, R. Matsui and T. Ogawa, 2015. Optimal arrangement of energy-dissipating members for seismic retrofitting of truss structures. Am. J. Eng. Applied Sci., 8: 455-464. DOI: 10.3844/ajeassp.2015.455.464

Theansuwan, W. and K. Triratanasirichai, 2011. The biodiesel production from roast Thai sausage oil by transesterification reaction. Am. J. Eng. Applied Sci., 4: 130-132. DOI: 10.3844/ajeassp.2011.130.132

Thongwan, T., A. Kangrang and S. Homwuttiwong, 2011. An estimation of rainfall using fuzzy set-genetic algorithms model. Am. J. Eng. Applied Sci., 4: 77-81. DOI: 10.3844/ajeassp.2011.77.81

Tourab, W., A. Babouri and M. Nemamcha, 2011. Experimental study of electromagnetic environment in the vicinity of high voltage lines. Am. J. Eng. Applied Sci., 4: 209-213. DOI: 10.3844/ajeassp.2011.209.213

Tsolakis, A.D. and K.G. Raptis, 2011. Comparison of maximum gear-tooth operating bending stresses derived from niemann's analytical procedure and the finite element method. Am. J. Eng. Applied Sci., 4: 350-354. DOI: 10.3844/ajeassp.2011.350.354

Vernardos, S.M. and C.J. Gantes, 2015. Cross-section optimization of sandwich-type cylindrical wind turbine towers. Am. J. Eng. Applied Sci., 8: 471-480. DOI: 10.3844/ajeassp.2015.471.480

Wang, J. and Y. Yagi, 2016. Fragment-based visual tracking with multiple representations. Am. J. Eng. Applied Sci., 9: 187-194. DOI: 10.3844/ajeassp.2016.187.194

Wang, L., G. Wang and C.A. Alexander, 2015. Confluences among big data, finite element analysis and high-performance computing. Am. J. Eng. Applied Sci., 8: 767-774. DOI: 10.3844/ajeassp.2015.767.774

Wang, L., T. Liu, Y. Zhang and X. Yuan, 2016. A methodology for continuous evaluation of cloud resiliency. Am. J. Eng. Applied Sci., 9: 264-273. DOI: 10.3844/ajeassp.2016.264.273

Waters, C., S. Ajinola and M. Salih, 2016. Dissolution sintering technique to create porous copper with sodium chloride using polyvinyl alcohol solution through powder metallurgy. Am. J. Eng. Applied Sci., 9: 155-165. DOI: 10.3844/ajeassp.2016.155.165

Wessels, L. and H. Raad, 2016. Recent advances in point of care diagnostic tools: A review. Am. J. Eng. Applied Sci., 9: 1088-1095. DOI: 10.3844/ajeassp.2016.1088.1095

Yang, M.F. and Y. Lin, 2015. Process is unreliable and quantity discounts supply chain integration inventory model. Am. J. Eng. Applied Sci., 8: 602-610. DOI: 10.3844/ajeassp.2015.602.610

Yeargin, R., R. Ramey and C. Waters, 2016. Porosity analysis in porous brass using dual approaches. Am. J. Eng. Applied Sci., 9: 91-97. DOI: 10.3844/ajeassp.2016.91.97

You, M., X. Huang, M. Lin, Q. Tong and X. Li *et al*., 2016. Preparation of $LiCoMnO_4$ assisted by hydrothermal approach and its electrochemical performance. Am. J. Eng. Applied Sci., 9: 396-405. DOI: 10.3844/ajeassp.2016.396.405

Zeferino, R.S., J.A.R. Ramón, E. de Anda Reyes, R.S. González and U. Pal, 2016. Large scale synthesis of ZnO nanostructures of different morphologies through solvent-free mechanochemical synthesis and their application in photocatalytic dye degradation. Am. J. Eng. Applied Sci., 9: 41-52. DOI: 10.3844/ajeassp.2016.41.52

Zhao, B., 2013. Identification of multi-cracks in the gate rotor shaft based on the wavelet finite element method. Am. J. Eng. Applied Sci., 6: 309-319. DOI: 10.3844/ajeassp.2013.309.319

Zheng, H. and S. Li, 2016. Fast and robust maximum power point tracking for solar photovoltaic systems. Am. J. Eng. Applied Sci., 9: 755-769. DOI: 10.3844/ajeassp.2016.755.769

Zotos, I.S. and T.N. Costopoulos, 2009. On the use of rolling element bearings' models in Precision maintenance. Am. J. Eng. Applied Sci., 2: 344-352. DOI: 10.3844/ajeassp.2009.344.352

Zulkifli, R., K. Sopian, S. Abdullah and M.S. Takriff, 2008. Effect of pulsating circular hot air jet frequencies on local and average nusselt number. Am. J. Eng. Applied Sci., 1: 57-61. DOI: 10.3844/ajeassp.2008.57.61

Zulkifli, R., K. Sopian, S. Abdullah and M.S. Takriff, 2009. Experimental study of flow structures of circular pulsating air jet. Am. J. Eng. Applied Sci., 2: 171-175. DOI: 10.3844/ajeassp.2009.171.175

Zurfi, A. and J. Zhang, 2016a. Model identification and wall-plug efficiency measurement of white LED modules. Am. J. Eng. Applied Sci., 9: 412-419. DOI: 10.3844/ajeassp.2016.412.419

Zurfi, A. and J. Zhang, 2016b. Exploitation of battery energy storage in load frequency control-a literature survey. Am. J. Eng. Applied Sci., 9: 1173-1188. DOI: 10.3844/ajeassp.2016.1173.1188