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POSITIONAL MODELING OF THE 2T6R ROBOT MECHANISM

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ABSTRACT

The positional modeling of the 2T6R robot mechanism is done for inverse kinematics, i.e. when the imposed positions of the end effector T, imposed, belonging to the final element 3, are known and the necessary positions and speeds of the two input motors, the two leading elements, are determined, 1 and 6. It is proposed to solve a simple algorithm in the program MathCad 2000, which uses for initiation the logical function If Log. The kinematic output parameters, i.e. the parameters of the foot and practically of the final effector, i.e. those of the point marked with T, will be determined for initiating the working algorithm using the logical functions, "If log (ical)", with the observation that here plays the role of parameters input; is positioned as already specified in reverse kinematics when the output is considered as input and input as output. The logical functions used, as well as the entire calculation program used, were written in Math Cad 2000.

Keywords: If Log; Math Cad; Robot; 2T6R robot; Kinematics; Inverse kinematics

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1. INTRODUCTION

The industrial robot is an integrated mechanical electronic informational system, used in the production process in order to achieve manipulation functions analogous to those performed by human hands, giving the manipulated object any freely programmed movement, within a technological process that takes place in a specific environment.

Intelligent robots represent the highest stage of development, at which the sensors are much more numerous and more complex, there are specific blocks and subsystems for moving and orienting their sensors, for measuring their movement, for processing information.

1) Trajectory generating mechanism (MGT): the mechanism formed by those kinematic couplings that make possible the displacement of the characteristic point M on the imposed trajectory. To generate the T trajectory, 3 degrees of freedom are also necessary: rotation around the Oz axis; vertical displacement along the Oz axis, and a radial displacement along the x-axis.
2) The orientation mechanism (MO) is the mechanism formed by the kinematic couplings that ensure the spatial orientation of the object, ie the mechanism that rotates after x ', y', and z '(palm-forearm of the human hand).
3) The gripping mechanism (MP) ensures the gripping and fixing of the manipulated object. If instead of handling we need welding, painting, cutting, processing, measuring ..., then the end effector will no longer be a gripper (gripping hand) but another corresponding final effector element.

Classification in terms of trajectory generation:

Robots with continuous positioning (in which the trajectory is generated continuously), which involves special blocks for correlating movements on 2 or 3 degrees of freedom, are called motion interpolators. The drive system and the control system must be suitable for this mode of operation. There must always be a well-defined bi-univocal correspondence between the command-movement.

The control system must be able to manage the movements on each degree of freedom and to correlate the movements with each other, in the sense of generating the mathematically described trajectory. Controllers, sensors, motion limiters are needed, in addition to the actuation system with actuators (electric or hydraulic motors, rarely pneumatic), for actuation, command, and permanent control of the realized movement.

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The controller is in fact a microchip, a microprocessor, which controls the whole process of the robot, from head to tail, through system drivers some specialized programs that control all the movements of the robot, these drivers being in constant contact with the machine, system, and computer, direct and reverse connections. The control drivers perform practically all the necessary commands, in the sense that they will move from the microchip (central unit and controller) to the robot, actuators (motors) effectively commanding the necessary imposed or self-detected movements (to the latest generation intelligent robots).

The drivers also check the execution of the movement by the entire robot mechanism and if the elements of the robot mechanism are in the indicated parameters (prescribed by the controller and microprocessor). In particular, the permanent positions of the end-effector end element, with the end-effector point T, its trajectory, and the sequential positions occupied in time are checked, so that they correspond to the commands given by the microprocessor, and the controller verifies their accuracy within certain prescribed limits. Whether the final element is within the prescribed limits or not is communicated by the sensors that permanently check the system parameters.

There are sensors for motion, speed, acceleration, shock, temperature, pressure ... The sensors give the reverse signal showing what happens to the whole system and especially to the final element end effect at any given time, and if the parameters of a point, but especially those of the final element, of the T point tracer, or effector, do not correspond at a given moment, the necessary correction is made immediately, the movement to the next step being corrected accordingly on each axis, more or less as the case may be.

The role of the limiters is not to let certain moving elements exceed certain limits. For example, they will stop the rotational movement reaching a certain angle and will control the reverse movement, ie the reverse rotation to the other end where the process will be reversed again. Both motion sensors and limiters are built according to the principles of transmitters, being generally very small.

There are also robots with sequential positioning.

Mechanic geometric parameters: Guide device: the set of all kinematic torques that compete to achieve the trajectories and spatial orientation of the manipulated objects within the imposed limits (MGT + MO). Final effector: clamping mechanism (in case of handling robots) or device (in case of specific operations). Load capacity: the maximum size of the mass that can be

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handled, in conditions of total safety, for the most unfavorable position of the robot and for the highest value of the acceleration that can develop it, in ascending vertical movement.

Unfavorable position: that position of the gripping mechanism, in which the manipulated object is maintained and moved only under the effect of the frictional forces, generated by the tightening action between the object and the ‘fingers’ of the mechanism. Normalized load-bearing capacities: 0.250; 1; 2.5; 6.4; 10; 25; 64; 100 ... etc.

Classification of robots according to the value of load-bearing capacity: Microrobots (tens of grams); Minirobots (hundreds of grams); Medium robots (of the order of kilograms); and Heavy robots (of the order of hundreds of kg); (Antonescu & Petrescu, 1985; 1989; Antonescu *et al*., 1985a; 1985b; 1986; 1987; 1988; 1994; 1997; 2000a; 2000b; 2001; Atefi et al., 2008; Avaei et al., 2008; Aversa *et al*., 2017a; 2017b; 2017c; 2017d; 2017e; 2016a; 2016b; 2016c; 2016d; 2016e; 2016f; 2016g; 2016h; 2016i; 2016j; 2016k; 2016l; 2016m; 2016n; 2016o; Azaga & Othman, 2008; Cao *et al*., 2013; Dong *et al*., 2013; El-Tous, 2008; Comanescu, 2010; Franklin, 1930; He *et al*., 2013; Jolgaf et al., 2008; Kannappan et al., 2008; Lee, 2013; Lin *et al*., 2013; Liu *et al*., 2013; Meena & Rittidech, 2008; Meena et al., 2008; Mirsayar *et al*., 2017; Ng et al., 2008; Padula, Perdereau & Pannirselvam, 2008; 2013; Perumaal & Jawahar, 2013; Petrescu, 2011; 2015a; 2015b; Petrescu & Petrescu, 1995a; 1995b; 1997a; 1997b; 1997c; 2000a; 2000b; 2002a; 2002b; 2003; 2005a; 2005b; 2005c; 2005d; 2005e; 2011a; 2011b; 2012a; 2012b; 2013a; 2013b; 2016a; 2016b; 2016c; Petrescu *et al*., 2009; 2016; 2017a; 2017b; 2017c; 2017d; 2017e; 2017f; 2017g; 2017h; 2017i; 2017j; 2017k; 2017l; 2017m; 2017n; 2017o; 2017p; 2017q; 2017r; 2017s; 2017t; 2017u; 2017v; 2017w; 2017x; 2017y; 2017z; 2017aa; 2017ab; 2017ac; 2017ad; 2017ae; 2018a; 2018b; 2018c; 2018d; 2018e; 2018f; 2018g; 2018h; 2018i; 2018j; 2018k; 2018l; 2018m; 2018n; Pourmahmoud, 2008; Rajasekaran et al., 2008; Shojaeefard et al., 2008; Taher et al., 2008; Tavallaei & Tousi, 2008; Theansuwan & Triratanasirichai, 2008; Zahedi et al., 2008; Zulkifli et al., 2008).

A special character in the study of robots is the study of inverse kinematics, with the help of which the map of the motor kinematic parameters necessary to obtain the trajectories imposed on the effector can be made. For this reason, in the proposed mechanism, we will present reverse kinematic modeling in this paper. The kinematic output parameters, i.e. the parameters of the foot and practically of the end effector, i.e. those of the point marked with T, will be determined for initiating the working algorithm with the help of logical functions, " If Log(ical)", with the observation that here they play the role of input parameters; it is positioned as already specified in

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the inverse kinematics when the output is considered as input and the input as output. The logical functions used, as well as the entire calculation program used, were written in Math Cad 2000.

2. METHODS AND MATERIALS

The positional modeling of the 2T6R robot mechanism is done for inverse kinematics, ie when the imposed positions of the end effector T, imposed, belonging to the final element 3, are known and the necessary positions and speeds of the two input motors, the two leading elements, are determined, 1 and 6. It is proposed to solve a simple algorithm in the program MathCad 2000, which uses for initiation the logical function If Log.

The kinematic output parameters, i.e. the parameters of the foot and practically of the final effector, i.e. those of the point marked with T, will be determined for initiating the working algorithm using the logical functions, "If log (ical)", with the observation that here plays the role of parameters input; is positioned as already specified in reverse kinematics when the output is considered as input and input as output. The logical functions used, as well as the entire calculation program used, were written in Math Cad 2000.

If it is desired that a point T of the execution element realizes a sequence of sequences on a trajectory required by a certain process it is necessary that through the inverse model to establish the kinematic parameters of the active torques. The dynamic parameters and consequently their actuation according to the process can be determined using the directly associated model. In the following, these characteristics for a 2T6R type manipulator robot are analyzed in detail.

The bimobile mechanism of Figure 1 can be used in various handling applications or in technological processes. There are six movable kinematic elements and eight kinematic couplings, of which two active kinematic couplings of translation A and D. The mechanism can achieve with the T end of the effector 3 any curve in a certain plane domain. It is obtained from the bimobile and bicontour kinematic chain of Figure 2a from which derives the direct structural model (Figure 2b) for which the base, the effector, as well as the active kinematic torques are nominated.

The kinematic scheme of the 2T6R plan robot presented with two cylindrical drive motors is arranged in figure 1.

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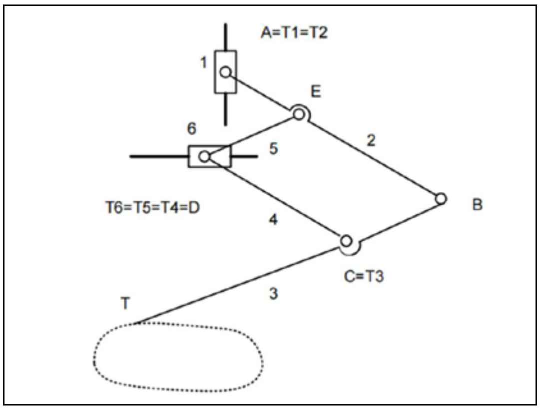

Figure 1: The kinematic scheme of the 2T6R plan robot presented with two cylindrical drive motors

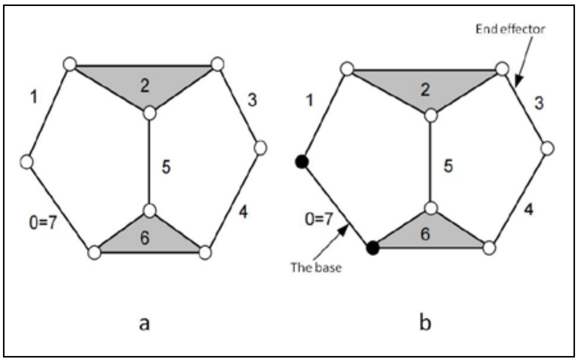

Figure 2: Structural scheme of the 2T6R mechanism

The connection of the modular groups (Figure 3) corresponding to the direct structural model (Figure 2b) comprises two initial active modular groups respectively GMAI (A, 1) and GMAI (D, 6), and two passive modular groups of dyad type, i.e. GMP1 (2.5) and GMP1 (3.4).

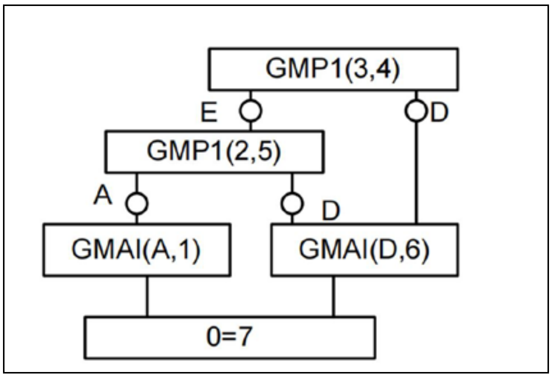

Figure 3: The connection of the modular groups corresponding to the direct structural model (Figure 2b), comprises two initial active modular groups respectively GMAI (A, 1) and GMAI (D, 6), and two passive modular groups of dyad type, i.e. GMP1 (2.5) and GMP1 (3.4).

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The structural model directly is used to establish the algorithm for calculating the components of the reaction torque in the kinematic torques based on the kinetic-static calculation modules.

The inverse structural model (Figure 4a) of the mechanism allows the determination of the parameters of the active torques A and D depending on the characteristics of the T point required by the technological process in which the system is used, representing the theme presented in this paper.

In the inverse structural model the passive modular group GMP8 from Figure 4b. In the connection of the groups (Figure 5) this structure is noticeable.

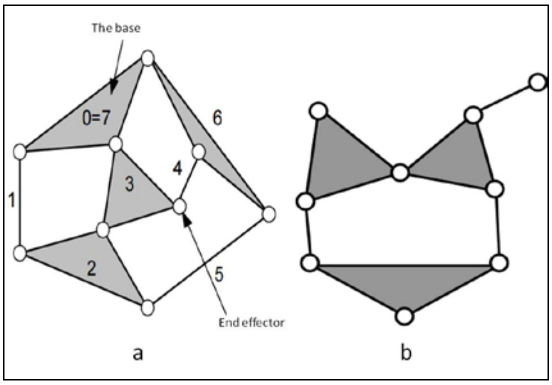

Figure 4: The inverse structural model (Figure 4a) of the mechanism allows the determination of the parameters of the active torques A and D depending on the characteristics of the T point. In the inverse structural model (Figure 4b) the passive modular group GMP8.

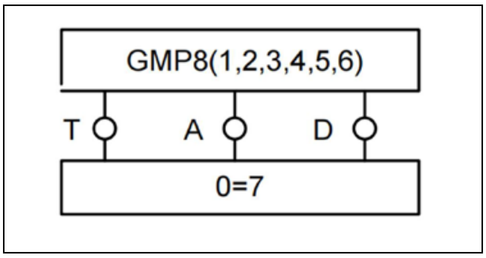

Figure 5: The connection of the groups GMP8(1, 2, 3, 4, 5, 6)

3. RESULTS AND DISCUSSION

The constant geometric parameters of the mechanism of Figs. 1 are listed in Table 1.

Table 1: Constant geometric parameters

TB	1.
TC	0.8
AE	0.3
EB	0.8
AB	1.1
DC	0.8
DE	0.3
XA	0.
YD	0.

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The input parameters of the point T corresponding to a trajectory, for example, rectilinear and alternative for a certain interval are shown in Table 2 and plotted in FIGURE 6.

Table 2: Initial parameters of the T point trajectory

Initial parameters of the T point	T0(-0.2, -0.8)

The description of the input parameters for the inverse model of the mechanism is presented in table 3. The trajectory of the T point represented in figure 6 is thus described.

Table 3: Input parameters

Coordinates of the current point T	XT_k:=if[k≤10,XT0+k·0.05,XT0+10·0.05-(k-10)·0.05] YT_k:=YT0

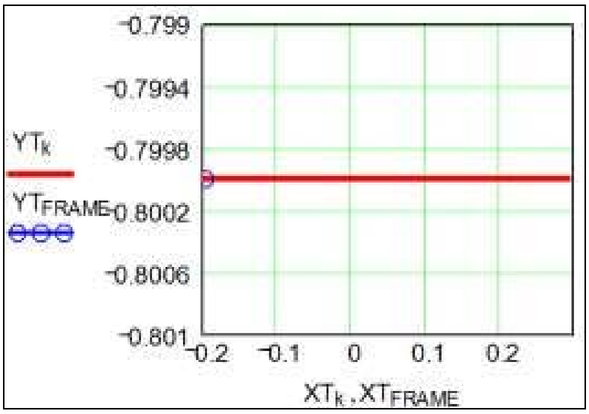

Figure 6: The trajectory of the point T

Figure 7 shows the dependent positional parameters for the inverse model of the mechanism. The algorithm for their determination is given in Table 4 and uses the connection of the modular groups of the inverse model (Figure 5).

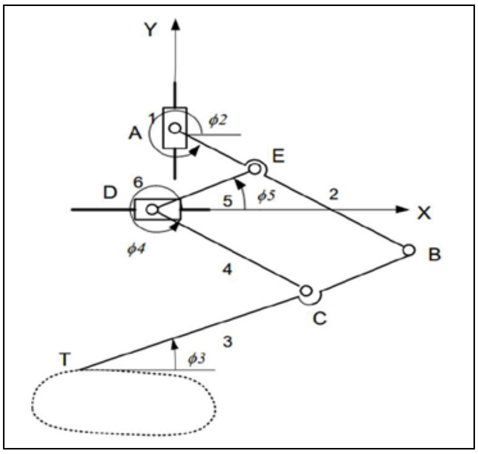

Figure 7: The dependent positional parameters for the inverse model of the mechanism

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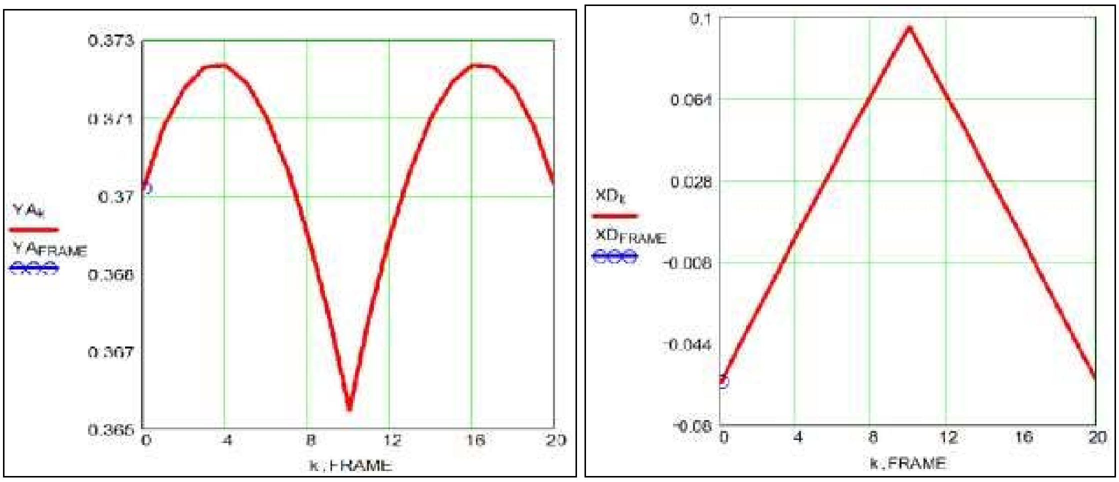
The GMP 8 passive modular group (Figure 4b) has the following dependent parameters: YAk(XTk,YTk), XDk(XTk,YTk), Φ2k(XTk,YTk), Φ3k(XTk,YTk), Φ4k(XTk,YTk), Φ5k(XTk,YTk).

Table 4: passive modular group

The pattern	Position-dependent parameters
GMP8(1,2,3,4,5,6)	$AB\cdot\cos(\phi 2)=XT_k+TB\cdot\cos(\phi 3)$ $YA+AB\cdot\sin(\phi 2)=YT_k+TB\cdot\sin(\phi 3)$ $XD+DC\cdot\cos(\phi 4)=XT_k+TC\cdot\cos(\phi 3)$ $YD+DC\cdot\sin(\phi 4)=YT_k+TC\cdot\sin(\phi 3)$ $AE\cdot\cos(\phi 2)=XD+DE\cdot\cos(\phi 5)$ $YA+AE\cdot\sin(\phi 2)=DE\cdot\sin(\phi 5)$
BPT(C)	$XC_k:=XT_k+TC\cdot\cos(\phi 3_k)$ $YC_k:=YT_k+TC\cdot\sin(\phi 3_k)$
BPT(B)	$XB_k:=XT_k+TB\cdot\cos(\phi 3_k)$ $YB_k:=YT_k+TB\cdot\sin(\phi 3_k)$
BPT(E)	$XE_k:=XA_k+AE\cdot\cos(\phi 2_k)$ $YE_k:=YA_k+AE\cdot\sin(\phi 2_k)$

Variation of the parameters of the active kinematic translation couples YAk(XTk,YTk), XDk(XTk,YTk) can be seen in the Figure 8a and Figure 8b.



a b
Figure 8: Variation of the parameters of the active kinematic

Similarly, the variation of the angular parameters (expressed in degrees) noted $\Phi20_k(XT_k,YT_k)$, $\Phi30_k(XT_k,YT_k)$, $\Phi40_k(XT_k,YT_k)$, $\Phi50_k(XT_k,YT_k)$ will be represented graphically in figure 9.

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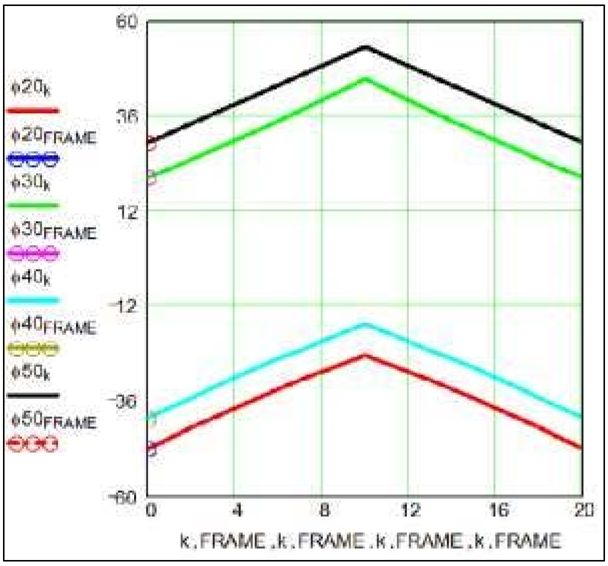
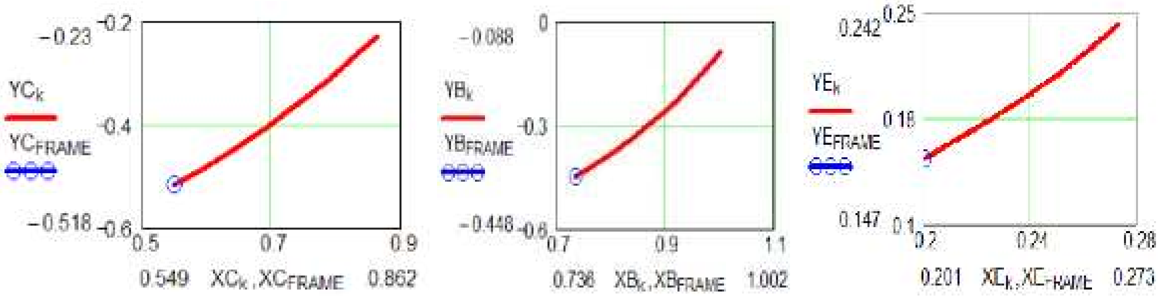


Figure 9: The variation of the angular parameters

To perform the kinetostatic analysis it is necessary to determine the parameters of the kinematic couples marked with C, B, E, the trajectories being shown respectively in Figure 10a, FIGURE 10b and FIGURE 10c.



a b c

Figure 10: perform the kinetostatic analysis

4. CONCLUSIONS

A special character in the study of robots is the study of inverse kinematics, with the help of which the map of the motor kinematic parameters necessary to obtain the trajectories imposed on the effector can be made. For this reason, in the proposed mechanism, we will present reverse kinematic modeling in this paper.

If it is desired that a point T of the execution element realizes a sequence of sequences on a trajectory required by a certain process it is necessary that through the inverse model to establish the kinematic parameters of the active torques. The dynamic parameters and consequently their actuation according to the process can be determined using the directly associated model. In the following, these characteristics for a 2T6R type manipulator robot are analyzed in detail.

The bimobile mechanism of Figure 1 can be used in various handling applications or in technological processes. There are six movable kinematic elements and eight kinematic couplings, of which two active kinematic couplings of translation A and D. The mechanism can achieve with the T end of the effector 3 any curve in a certain plane domain. It is obtained from the bimobile and bicontour kinematic chain of Figure 2a from which derives the direct structural model (Figure 2b) for which the base, the effector, as well as the active kinematic torques are nominated.

Inverse kinematic modeling is generally the most sought after, as the most important, but in most situations, it is also the most difficult to determine. In the presented paper, the MathCad2000 software was used in order to facilitate the calculations, because the software automatically solves the linear and nonlinear systems through its internal procedures that must be called within the program.

As an important function, the "IfLog" logic function was used twice in the program to initiate the calculations, by determining the input variables in the inverse kinematics.

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6. FUNDING INFORMATION

a) 1-Research contract: 1-Research contract: Contract number 36-5-4D/1986 from 24IV1985, beneficiary CNST RO (Romanian National Center for Science and Technology) Improving dynamic mechanisms.

b) 2-Contract research integration. 19-91-3 from 29.03.1991; Beneficiary: MIS; TOPIC: Research on designing mechanisms with bars, cams and gears, with application in industrial robots.

c) 3-Contract research. GR 69/10.05.2007: NURC in 2762; theme 8: Dynamic analysis of mechanisms and manipulators with bars and gears.

d) 4-Labor contract, no. 35/22.01.2013, the UPB, "Stand for reading performance parameters of kinematics and dynamic mechanisms, using inductive and incremental encoders, to a Mitsubishi Mechatronic System" "PN-II-IN-CI-2012-1-0389".

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e) All these matters are copyrighted! Copyrights: 394-qodGnhhtej, from 17-02-2010 13:42:18; 463-vpstuCGsiy, from 20-03-2010 12:45:30; 631-sqfsgqvutm, from 24-05-2010 16:15:22; 933-CrDztEfqow, from 07-01-2011 13:37:52.

7. ETHICS

Authors should address any ethical issues that may arise after the publication of this manuscript.

REFERENCES

Antonescu, P., & Petrescu, F. I. T. (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., & Petrescu, F. I. T. (1989). Contributions to kinetoplast dynamic analysis of distribution mechanisms. **SYROM'89**, Bucharest.

Antonescu, P., Oprean, M., & Petrescu, F. I. T. (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., Oprean, M., & Petrescu, F. I. T. (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., Oprean, M., & Petrescu, F. I. T. (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., Oprean, M., & Petrescu, F. I. T. (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., Oprean, M., & Petrescu, F. I. T. (1988). **Analytical synthesis of Kurz profile**, rotating the flat cam. Mach, Build. Rev.

Antonescu, P., Petrescu, F. I. T., & Antonescu, O. (1994). **Contributions to the synthesis of the rotating cam mechanism and the tip of the balancing tip**. Brasov.

Antonescu, P., Petrescu, F. I. T., & Antonescu, O. (1997). Geometrical synthesis of the rotary cam and balance tappet mechanism. Bucharest, (3), 23-23.

Antonescu, P., Petrescu, F. I. T., & Antonescu, O. (2000[a]). 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, 51-56.

Antonescu, P., Petrescu, F. I. T., & Antonescu, O. (2000b). Synthesis of the rotary cam profile with balance follower. **Proceedings of the 8th Symposium on Mechanisms and Mechanical Transmissions**, (MMT' 00)., Timişoara, 39-44.

Antonescu, P., Petrescu, F. I. T., & Antonescu, O. (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, 31-36.

Atefi, G., Abdous, M. A., & Ganjehkaviri, A. (2008). Analytical Solution of Temperature Field in Hollow Cylinder under Time Dependent Boundary Condition Using Fourier series, **Am. J. Eng. Applied Sci.**, 1(2), 141-148. DOI: 10.3844/ajeassp.2008.141.148

Avaei, A., Ghotbi, A. R., & Aryafar, M. (2008). Investigation of Pile-Soil Interaction Subjected to Lateral Loads in Layered Soils, **Am. J. Eng. Applied Sci.**, 1(1), 76-81. DOI: 10.3844/ajeassp.2008.76.81

Aversa, R., Petrescu, R. V. V., Apicella, A., & Petrescu, F. I. T. (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., Petrescu, R. V. V., Akash, B., Bucinell, R. B., & Corchado, J. M. (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., Petrescu, R. V. V., Apicella, A., Petrescu, F. I. T. & Calautit, J. K. (2017c). Something about the V engines design. **Am. J. Applied Sci.** (14), 34-52. DOI: 10.3844/ajassp.2017.34.52

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

Aversa, R., Petrescu, R. V. V., Akash, B., Bucinell, R. B., & Corchado, J. M. (2017e). Something about the balancing of thermal motors. **Am. J. Eng. Applied Sci.** (10), 200-217. DOI: 10.3844/ajeassp.2017.200.217

Aversa, R., Petrescu, F. I. T., Petrescu, R. V. V., & Apicella, A. (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., Parcesepe, D., Petrescu, R. V. V., Chen, G., &Petrescu, F. I. T. (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., Petrescu, R. V. V., Petrescu, F. I. T., & Apicella, A. (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., Tamburrino, F., Petrescu, R. V. V., Petrescu, F. I. T., & Artur, M. (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., Buzea, E. M., Petrescu, R. V. V., Apicella, A., & Neacsa, M. (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., Petrescu, R. V. V., Sorrentino, R., Petrescu, F. I. T., & Apicella, A. (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., Perrotta, V., Petrescu, R. V. V., Misiano, C., & Petrescu, F. I. T. (2016g). From structural colors to super-hydrophobicity and achromatic transparent protective coatings: Ion

ISSN: 2236-269X
DOI: 10.14807/ijmp.v12i9.1563

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

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

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

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

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

Azaga, M., & Othman, M. (2008). Source Couple Logic (SCL).: Theory and Physical Design, **Am. J. Eng. Applied Sci.**, 1(1), 24-32. DOI: 10.3844/ajeassp.2008.24.32

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

Comanescu, A. (2010). Bazele Modelarii Mecanismelor. 1st Edn., **E. Politeh, Press**, Bucureşti, pp: 274.

Dong, H., Giakoumidis, N., Figueroa, N., & Mavridis, N. (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

Yousif El-Tous, (2008). Pitch Angle Control of Variable Speed Wind Turbine, **Am. J. Eng. Applied Sci.**, 1(2), 118-120. DOI: 10.3844/ajeassp.2008.118.120

Franklin, D. J. (1930). Ingenious Mechanisms for Designers and Inventors. 1st Edn., **Industrial Press Publisher**.

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

http://www.ijmp.jor.br *v. 12, n. 9, Special Edition, December 21, IFLOG 2020*
ISSN: 2236-269X
DOI: 10.14807/ijmp.v12i9.1563

Jolgaf, M., Sulaiman, S. B., Ariffin, M. K. A., & Faieza, A. A. (2008). Closed Die Forging Geometrical Parameters Optimization for Al-MMC, **Am. J. Eng. Applied Sci.**, 1(1), 1-6. DOI : 10.3844/ajeassp.2008.1.6

Kannappan, A. N., Kesavasamy, R., & Ponnuswamy, V. (2008). Molecular Interaction Studies of H-Bonded Complexes of Benzamide in 1,4-Dioxan with Alcohols From Acoustic and Thermodynamic Parameters, **Am. J. Eng. Applied Sci.**, 1(2), 95-99. DOI: 10.3844/ajeassp.2008.95.99

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

Lin, W., Li, B., Yang, X., & Zhang, D. (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., Zhou, W., Lai, X., & Zhu, S. (2013). An efficient inverse kinematic algorithm for a PUMA560-structured robot manipulator. **IJARS**. DOI: 10.5772/56403

Meena, P., & Rittidech, S. (2008). Comparisons of Heat Transfer Performance of a Closed-looped Oscillating Heat Pipe and Closed-looped Oscillating Heat Pipe with Check Valves Heat Exchangers, **Am. J. Eng. Applied Sci**., 1(1), 7-11. DOI: 10.3844/ajeassp.2008.7.11

Meena, P., Rittidech, S., & Tammasaeng, P. (2008). Effect of Inner Diameter and Inclination Angles on Operation Limit of Closed-Loop Oscillating Heat-Pipes with Check Valves, **Am. J. Eng. Applied Sci.**, 1(2), 100-103. DOI: 10.3844/ajeassp.2008.100.103

Mirsayar, M. M., Joneidi, A., Petrescu, R. V. V., Petrescu, F. I. T., & Berto, F. (2017). Extended MTSN criterion for fracture analysis of soda lime glass. **Eng. Fracture Mechan.**(178), 50-59. DOI: 10.1016/j.engfracmech.2017.04.018

Ng, K. C., Yusoff,M. Z., Munisamy, K., Hasini, H., & Shuaib, N. H. (2008). Time-Marching Method for Computations of High-Speed Compressible Flow on Structured and Unstructured Grid, **Am. J. Eng. Applied Sci.**, 1(2), 89-94. DOI: 10.3844/ajeassp.2008.89.94

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

Pannirselvam, N., Raghunath, N., & Suguna, K. (2008). Neural Network for Performance of Glass Fibre Reinforced Polymer Plated RC Beams, **Am. J. Eng. Applied Sci.**, 1(1), 82-88. DOI: 10.3844/ajeassp.2008.82.88

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

Petrescu, F. I. T., & Petrescu, R. V. V. (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. I. T., & Petrescu, R. V. V. (1995b). **Contributions to the synthesis of internal combustion engine distribution mechanisms**. Bucharest(1), 257-264.

Petrescu, F. I. T., & Petrescu, R. V. V. (1997a). **Dynamics of cam mechanisms (exemplified on the classic distribution mechanism).**. Bucharest(3), 353-358.

Petrescu, F. I. T., & Petrescu, R. V. V. (1997b). **Contributions to the synthesis of the distribution mechanisms of internal combustion engines with a Cartesian coordinate method**. Bucharest(3), 359-364.

http://www.ijmp.jor.br *v. 12, n. 9, Special Edition, December 21, IFLOG 2020*
ISSN: 2236-269X
DOI: 10.14807/ijmp.v12i9.1563

Petrescu, F. I. T., & Petrescu, R. V. V. (1997c). **Contributions to maximizing polynomial laws for the active stroke of the distribution mechanism from internal combustion engines**. Bucharest(3), 365-370.

Petrescu, F. I. T., & Petrescu, R. V. V. (2000a). Synthesis of distribution mechanisms by the rectangular (Cartesian). coordinate method. **Proceedings of the 8th National Conference on International Participation**, (CIP' 00)., Craiova, Romania, 297-302.

Petrescu, F. I. T., & Petrescu, R. V. V. (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, 291-296.

Petrescu, F. I. T., & Petrescu, R. V. V. (2002a). Motion laws for cams. Proceedings of the International Computer Assisted Design, **National Symposium Participation**, (SNP' 02)., Braşov, p 321-326.

Petrescu, F. I. T., & Petrescu, R. V. V. (2002b). Camshaft dynamics elements. **Proceedings of the International Computer Assisted Design, National Participation Symposium**, (SNP' 02)., Braşov), 327-332.

Petrescu, F. I. T., & Petrescu, R. V. V. (2003). Some elements regarding the improvement of the engine design. **Proceedings of the National Symposium, Descriptive Geometry, Technical Graphics and Design**, (GTD' 03)., Braşov), 353-358.

Petrescu, F. I. T., & Petrescu, R. V. V. (2005a). The cam design for a better efficiency. **Proceedings of the International Conference on Engineering Graphics and Design**, (EGD' 05)., Bucharest), 245-248.

Petrescu, F. I. T., & Petrescu, R. V. V. (2005b). Contributions at the dynamics of cams. **Proceedings of the 9th IFToMM International Symposium on Theory of Machines and Mechanisms**, (TMM' 05)., Bucharest, Romania, 123-128.

Petrescu, F. I. T., & Petrescu, R. V. V. (2005c). Determining the dynamic efficiency of cams. **Proceedings of the 9th IFToMM International Symposium on Theory of Machines and Mechanisms**, (TMM' 05)., Bucharest, Romania, 129-134.

Petrescu, F. I. T., & Petrescu, R. V. V. (2005d). An original internal combustion engine. **Proceedings of the 9th IFToMM International Symposium on Theory of Machines and Mechanisms**, (TMM' 05)., Bucharest, Romania, 135-140.

Petrescu, F. I. T., & Petrescu, R. V. V. (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, 141-146.

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

Petrescu, F. I. T., & Petrescu, R. V. V. (2011b). Trenuri Planetare. **Createspace Independent Pub**., 104 pages, ISBN-13: 978-1468030419.

Petrescu, F. I. T., & Petrescu, R. V. V. (2012a). Kinematics of the planar quadrilateral mechanism. **ENGEVISTA,** (14), 345-348.

Petrescu, F. I. T., & Petrescu, R. V. V. (2012b). Mecatronica-Sisteme Seriale si Paralele. 1st Edn., **Create Space Publisher**, USA, 128.

Petrescu, F. I. T., & Petrescu, R. V. V. (2013a). Cinematics of the 3R dyad. **ENGEVISTA,** (15), 118-124.

ISSN: 2236-269X
DOI: 10.14807/ijmp.v12i9.1563

Petrescu, F. I. T., & Petrescu, R. V. V. (2013b). Forces and efficiency of cams. **Int. Rev. Mechanical Eng**.

Petrescu, F. I. T., & Petrescu, R. V. V. (2016a). Parallel moving mechanical systems kinematics. **ENGEVISTA,** (18), 455-491.

Petrescu, F. I. T., & Petrescu, R. V. V. (2016b). Direct and inverse kinematics to the anthropomorphic robots. **ENGEVISTA,** (18), 109-124.

Petrescu, F. I. T., & Petrescu, R. V. V. (2016c). Dynamic cinematic to a structure 2R. **Revista Geintec-Gestao Inovacao E Tecnol.** (6), 3143-3154.

Petrescu, F. I. T., Grecu, B., Comanescu, A., & Petrescu, R. V. V. (2009). Some mechanical design elements. **Proceeding of the International Conference on Computational Mechanics and Virtual Engineering**, (MVE' 09)., Braşov, 520-525.

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

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

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

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

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

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

http://www.ijmp.jor.br v. 12, n. 9, Special Edition, December 21, IFLOG 2020
ISSN: 2236-269X
DOI: 10.14807/ijmp.v12i9.1563

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

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

Petrescu, R. V. V., Aversa, R., Kozaitis, S., Apicella, A., & Petrescu, F. I. T. (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. V., Aversa, R., Akash, B., R. Bucinell, R., & Corchado, J. (2017m). Modern propulsions for aerospace-a review. J. Aircraft Spacecraft Technol. (1), 1-8. DOI: 10.3844/jastsp.2017.1.8

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

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

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

Petrescu, R. V. V., Aversa, R., Akash, B., Bucinell, R., & Corchado, J. (2017q). Our universe. **J. Aircraft Spacecraft Technol.** (1), 69-79. DOI: 10.3844/jastsp.2017.69.79

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

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

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

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

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

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

http://www.ijmp.jor.br v. 12, n. 9, Special Edition, December 21, IFLOG 2020
ISSN: 2236-269X
DOI: 10.14807/ijmp.v12i9.1563

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

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

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

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

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

Petrescu, R. V. V., Aversa, R., Akash, B., Berto, F., & Apicella, A. (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. V., Aversa, R., Akash, B., Berto, F., & Apicella, A. (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., Aversa, R., Apicella, A., Mirsayar, M. M., & Kozaitis, S. (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. V., Aversa, R., Apicella, A., Mirsayar, M. M., & Kozaitis, S. (2018b). There is life on mars? **Am. J. Eng. Applied Sci.** (11), 78-91. DOI: 10.3844/ajeassp.2018.78.91

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

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

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

http://www.ijmp.jor.br *v. 12, n. 9, Special Edition, December 21, IFLOG 2020*
ISSN: 2236-269X
DOI: 10.14807/ijmp.v12i9.1563

Petrescu, R. V. V., Aversa, R., Apicella, A., & Petrescu, F. I. T. (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. V., Aversa, R., Apicella, A., & Petrescu, F. I. T. (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. V., Aversa, R., Apicella, A., & Petrescu, F. I. T. (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. V., Aversa, R., Apicella, A., & Petrescu, F. I. T. (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. V., Aversa, R., Apicella, A., & Petrescu, F. I. T. (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

Pourmahmoud, N. (2008). Rarefied Gas Flow Modeling inside Rotating Circular Cylinder, **Am. J. Eng. Applied Sci.**, 1(1), 62-65. DOI: 10.3844/ajeassp.2008.62.65

Rajasekaran, A., Raghunath), N., & Suguna, K. (2008). Effect of Confinement on the Axial Performance of Fibre Reinforced Polymer Wrapped RC Column, **Am. J. Eng. Applied Sci.**, 1(2), 110-117. DOI: 10.3844/ajeassp.2008.110.117

Shojaeefard, M. H., Goudarzi, K., Noorpoor, A. R., & Fazelpour, M. (2008). A Study of Thermal Contact using Nonlinear System Identification Models, **Am. J. Eng. Applied Sci.,** 1(1), 16-23. DOI: 10.3844/ajeassp.2008.16.23

Taher, S. A., Hematti, R., & Nemati, M. (2008). Comparison of Different Control Strategies in GA-Based Optimized UPFC Controller in Electric Power Systems, **Am. J. Eng. Applied Sci.**, 1(1), 45-52. DOI: 10.3844/ajeassp.2008.45.52

Tavallaei, M. A., & Tousi, B. (2008). Closed Form Solution to an Optimal Control Problem by Orthogonal Polynomial Expansion, **Am. J. Eng. Applied Sci.**, 1(2), 104-109. DOI: 10.3844/ajeassp.2008.104.109

Theansuwan, W., & Triratanasirichai, K. (2008). Air Blast Freezing of Lime Juice: Effect of Processing Parameters, **Am. J. Eng. Applied Sci.**, 1(1), 33-39. DOI: 10.3844/ajeassp.2008.33.39

Zahedi, S. A., Vaezi, M., & Tolou, N. (2008). Nonlinear Whitham-Broer-Kaup Wave Equation in an Analytical Solution, **Am. J. Eng. Applied Sci.**, 1(2), 161-167. DOI: 10.3844/ajeassp.2008.161.167

Zulkifli, R., Sopian, K., Abdullah, S., & Takriff, M. S. (2008). Effect of Pulsating Circular Hot Air Jet Frequencies on Local and Average Nusselt Number, **Am. J. Eng. Applied Sci.**, 1(1), 57-61. DOI: 10.3844/ajeassp.2008.57.61