PERSONAL INFORMATION

Dr. **Mirjana Filipović**, Associate Research Professor
(maiden name: **Stanivuk**)

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| Date of birth 25/03/1955 | Nationality Serbian

JOB APPLIED FOR
POSITION
PREFERRED JOB
STUDIES APPLIED FOR

Robotics

WORK EXPERIENCE

1979 - 1991

Engineering Research

- On the 1979 started working at the Institute "Mihajlo Pupin", Belgrade, Serbia, and still works there. Up to 1991. her major concern were engineering assignments and projects for the "Center for Pneumatics", IMP, managed by Vladimir Kokotović, M Sc. Worked on: investigation, development, design, realization and start up of: control regulation electro-pneumatic systems for drinking water purification for Chemical, Food and Pharmaceutical Industries, "pneumatic forwarding system" and development of components for above pneumatic forwarding equipment. She realized a series of Technical Solutions and participated in projects of relevance in this area.

Participation in Projects of Relevance (1979-1991)

1. Control and Regulation Projecting for Drinking Water Purification Equipment, Water Power Engineering: Banovo Brdo (three phases), Bežanija (three phases), Bele Vode (three phases), Novi Sad (two phases), Niš, Ruma, Sombor, Novi Pazar, Vranje, Lebane, Surdulica, Nova Gradiška, Valjevo, Pančevo, Banja Luka, Kruševac, Kumanovo, Titova Mitrovica, Gnjilane, Aleksinac..from 1980 until 1992.

2. Project in the Leather Processing Industry: Telman, Ostškov, Kursk, 1983 – 1985.

3. Project on Pneumatic Forwarding System for : Clinical Center, Inex, Main post – Belgrade, Main post – Novi Sad, Clinical Center – Kraljevo. From 1982 until 1992.

4. Project for decarbonization of industrial water: «HIP» Pančevo, 1986. · Project for Ministry of Science of the Republic of Serbia

Industrial Technical Solutions 1980-1992

1. Electro- pneumatic control device for water cleaning equipment within water of the Waterpower Engineering: Belgrade (Bele Vode), Niš, Vranje, Kumanovo, etc. (1980 – 1992).

2. Pneumatic System Level Regulation within Filter Installations, Waterpower Engineering: water supply of Novi Pazar, Valjevo, "HIP" Pančevo, Vranje, Nova Gradiška and other. (1980 - 1992).

3. Pneumatic actuator system of given values: 125, 160, 200, waterworks. (1980 – 1992).

4. Device for pneumatic measurements and level indication within tanks with acid and base, "HIP", Pančevo, 1985.

5. Control system designing and development with components for pneumatic forwarding system. Clinical center and Inex, Belgrade, 1985 – 1992.

6. Projecting, Development and Implementation of two-stages point for pneumatic forwarding. Inex and Clinical center Belgrade, 1985 – 1992.

7. Projecting and Development and Realization of Station and Cartridge for Pneumatic Forwarding System. 1980-1992.

- 1991. - Jun 2015. The tasks in the field of Robotics became her field of interest.

1991 - Jun 2015

Scientific Research

Industrial, humanoid and Cable suspended Parallel Robots structure

1. Area of industrial, humanoid robotic structure.

In the field of scientific research the main results can be mentioned. She defined:

- a joint in a new way, depending in the motor state (active or locked) and type of elastic or rigid element (gear and/or link) that follows behind the motor.
- a connection of the Euler-Bernoulli equation and equation of motion at any point of elastic line of considered elastic beam.
- expansion of the Euler-Bernoulli equation from several aspects:
  - elastic deformation is a consequence of the overall movement dynamics of the robotic system,
  - general form of the transversal elastic deformation is defined by superimposing particular solutions of oscillatory character (solution of Daniel Bernoulli) and stationary solution of the forced character (which is a consequence of the forces involved),
  - Euler-Bernoulli equation (based on the known laws of dynamics) is supplemented with all the forces that are participating in the formation of the bending moment of the considered mode, what causes the difference in the structure of these equations for each mode,
  - general form of the elastic line is a direct outcome of the dynamics of system motion and cannot be represented by one scalar equation but three equations are needed to define the position and three equations to define the orientation of each point on the elastic line,
  - damping is an omnipresent elasticity characteristic of real systems, so that it is naturally included in the Euler-Bernoulli equation,
  - Structure of the stiffness matrix must also have the elements outside the diagonal, because of the existence of strong coupling between the elasticity forces involved.
- new structure of the mathematical models of actuators: With elastic robotic systems, the motor torque is opposed by the elasticity moment of the first elastic

element coming directly after the motor. If it is a flexible link, then the motor torque is opposed by the bending moment of the first flexible mode that comes after the motor, and also, in part, by the bending moments of the other flexible modes that are connected sequentially after the first mode. Depending on their position, all modes of the first link, coming after the motor, influence the motor motion dynamics. Mathematical model of the motor is related to the rest of the mechanism via an equivalent flexibility moment. However, if an elastic gear comes directly after the motor, then the motor torque is opposed by the gear deflection moment.
The new structure of stiffness matrix and mathematical model of the motor are a consequence of the coupling between the present modes of particular links.

- Four types of elastic industrial configurations were defined, analyzed and modeled. Mathematical models of these typical elastic configurations were defined by using previously defined principles; and at the same moment the program packages were created for every configuration:

  a) Program system, EBTLOM **:** "Euler-Bernoulli Theory Link One Mode", 2009,

  b) Program system, TMODES: "New form of the Euler-Bernoulli equation in presence of high modes (Two MODES)", 2010,

  c) Program system, TIPEX: "Robotic Example in Vertical Plane with Elastic Gear and Flexible Link in the Presence of the Second Mode and Dynamic External Force", 2011,

  d) Program system, VERSPACE: "The spatial movement of the vertical elastic links" , 2011.

  e) Program system, FLEXI: "Humanoid robotic system with rigid and elastic elements that walks on immobile/mobile platform", 2009.

- realized the software package FLEXI which is based on universal form of robotic systems. In this software is defined the algorithm for forming the mathematical model of a complex humanoid robotic system biped that walks on an immobile/mobile platform of any configuration with rigid and (or) flexible elements of gear.

- existence of dynamic coupling between the biped and the movement platform in the course of robotic task realization.

- procedure for creating the reference trajectory which did encompass or did not encompass the magnitude of elastic deformation and effects of coupling between the biped and the movement platform.

- procedure for modeling elasticity in the contact of foot sole.

- a general form of mathematical model of the robot system (can be a humanoid locomotion system with rigid and (or) elasticity gears) walking on any platform configuration, immobile or mobile (with rigid and (or) elasticity gears).

2. Area of Cable suspended Parallel Robots, CPR systems.

- **CPR systems which consist of rigid ropes (wires)**

In the field of scientific research the main results can be mentioned. She defined:

a. several types of Cable suspended Parallel Robots were defined, CPR systems which have a parallelepipedal shape of the workspace and are controlled only with three motors. These CPR systems are not redundant. By designing these systems like this, the maximal workspace is achieved with only three motors. Workspace is doubled in comparison to the similar constructions with the same number of motors.

b. new methodology for defining kinematic model of CPR systems. It includes trajectory, velocity and acceleration and it is a prerequisite for the formulation of a dynamic model. This novel procedure is named KinCPR-Solver - Kinematic Cable Parallel Robot Solver. The relation between the camera carrier motion and the motors angular positions has been established. The Jacobian matrix plays an important role in developing the CPR dynamic model.

c. the complex relation between the resultant motor load torque (acting as a load at the first, second and third motor shafts) and external forces (acting at the camera carrier), using the Lagrange's principle of virtual work. Because of the construction complexity of CPR systems, the Lagrange's principle of virtual work has been adapted for these systems.

d. dynamic model of system where the Lagrange's principle of virtual work participates in the mathematical model of the motors.

e. strong coupling between each motors' motion, as well as coupling between each motors' motion and the camera carrier motion.

f. currently, there is no general software package that can be used for automatic modeling of different types of CPR systems. This means any type of CPR system needs to be manually developed and programmed.

g. six types of CPR systems: RSCPR, RFCPR, CPR-A, CPR-B, CPR-C, and CPR-D system, were presented, modeled and analyzed. Each of these systems are manually developed and programmed in program packages. The software packages ORIGI, ORVER, AIRCAMA, AIRCAMB, AIRCAMC, and AIRCAMD have been developed to analyze the RSCPR, RFCPR, CPR-A, CPR-B, CPR-C, and CPR-D models, respectively.

- **CPR systems which consist of elastic ropes (wires)**

In the field of scientific research the main results can be mentioned. She defined:

h. new methodology for defining relation between the motor angular position and the elastic deformation. For definition of the kinematic and dynamic model of CPR system with elastic ropes, it is important that one understands the system and its physicality, i.e. it is important that the model of that CPR construction with rigid ropes is defined. The model of the rigid CPR construction is used to generate the control structure, i.e. it is used to define the referent trajectory of the camera carrier and the referent trajectory of the motors' shafts angular position. The significance of the Elastic rope Cable suspended Parallel Robots modeling is the relation between the motor angular position and the elastic deformation of the corresponding rope which is defined by the fictitious coordinates. This relationship is determined for each motor motion and its corresponding rope deformation. This novel procedure is named ED+M method, which means Elastic Deformations plus Motor motion.

i. relation between the fictitious elastic load torque and the external force, which is calculated using the Lagrange principle of virtual work, is expressed with the Jacobian matrix. The Jacobian matrix of the elastic CPR system relates the velocities of the external coordinates with the velocities of the fictitious coordinates.

The software packages ORFLEX, OGTOM, OGIFLEX i OVTOM have been developed to analyze the eSCPR (elastic ropes S-type Cable Suspended Parallel Robot, with one mode), eSCPR (elastic ropes S-type Cable Suspended Parallel Robot, with two modes), eFCPR (elastic ropes F-type Cable Suspended Parallel Robot, with one mode) and eFCPR (elastic ropes F-type Cable Suspended Parallel Robot, with two modes) systems, respectively.

Implementation of the elasticity feature of ropes in CPR system is in the development stage.

Participation in education and formation of scientific staff (2012 - Jun 2015)

Dr Mirjana Filipović is guiding PhD student Ljubinko Kevac since the beginning of 2012 until today, as his co-mentor. PhD candidate Ljubinko Kevac has successfully passed all the exams at School of Electrical Engineering in Belgrade during this period. Also, he has conscientiously worked on his dissertation. He is working on his doctoral dissertation by working full time at the Institute Mihajlo Pupin (Robotics laboratory) and Dr Mirjana Filipović is responsible for his professional and scientific engagement. Topic of his doctoral dissertation is: Analysis, synthesis, modelling and control of the CPR (Cable-suspended Parallel Robot) systems.

Scientific publications (summary)

- 2 chapters in research monographs
- 14 international journal papers
- 11 national journal papers
- 38 international conference papers
- 1 invited lecture
- 31 national conference papers
- 15 software products
- 2 patents

Business or sector Public sector – Research and Development

2013 - Jun 2015 **Associated Research Professor**

University of Belgrade, Mihajlo Pupin Institute,Volgina 15, 11000 Belgrade, Serbia, http://www.pupin.rs/RnDProfile/filipovic.html

Business or sector Public sector

2008 - 2013 **Assistant Research Professor**

University of Belgrade, Mihajlo Pupin Institute, Volgina 15, 11000 Belgrade, Serbia, http://www.pupin.rs/RnDProfile/filipovic.html

Business or sector Public sector

EDUCATION AND TRAINING

2007 **PhD in Technical Sciences** PhD

University of Belgrade, School of Electrical Engineering, University of Belgrade, Serbia

- Contribution to modeling of flexibility of active mechanisms with special emphasis on humanoid robots, Supervisor: Prof. Dr. Veljko Potkonjak

1998 **MSc in Technical Sciences** MSc

University of Belgrade, School of Electrical Engineering, University of Belgrade, Serbia

- Analysis of dynamic accuracy of manipulation robots, Supervisor: academician Miomir Vukobratović

1978 **BSc in Electrical Engineering (5 years studies)** BSc

University of Belgrade, Department for Automation at the Faculty of mechanical engineering, Serbia, Supervisor: Prof. Dr. Ljubomir Grujić

PERSONAL SKILLS

Mother tongue(s): Serbian

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B1/2	B1/2	B1/2	B1/2r	B1/2
	Professional language schools certificates.				
	Integral part of regular education, from primary to university level..				

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user
Common European Framework of Reference for Languages

Communication skills

Organisational / managerial skills

Job-related skills

Expertise:

- Modeling
- Mathematics
- Mechanics
- Elasticity
- Control
- Programming

Computer skills

- Working experience with computer operating systems: MS-DOS, MS-WINDOWS; VAX/VMS, UNIX, Windows, Vista, Linux.
- Advanced programming skill in: MATLAB/SIMULINK
- Advance use of the applicative software: Corel Draw, Latex, MS Office (Word, Excel, Power Point), Photo Shop, etc.

Other skills

Driving licence

- B type (car driving) since 1979

ADDITIONAL INFORMATION

Publications
Presentations
Projects
Conferences
Seminars
Honours and awards
Memberships
References

116 published scientific papers – see Annex 1
Participation in realization of 8 research projects - see Annex 2:
Number of citations: 25 (https://www.scopus.com/cto2/main.url?stateKey=CTOF_590559438&authors=15836742700&origin=AuthorNamesList)

- 2008, member of the Scientific Council of the Mihailo Pupin Institute
- 2011, Member of IEEE Robotics & Automation Society

ANNEXES

Annex 1 : Mirjana Filipovic: Bibliography

Chapters in research monographs

[1] Mirjana Filipovic, „Mathematical model of aerial robots as the basis for new research", Scientific Review, Series: Scientific and Engineering, Special Issue Nonlinear Dynamics Dedicated to Milutin Milankovic (1879-1958), Serbian Scientific Society, Belgrade 2013, pp. 303-318. ISSN 0350-2010.

[2] Ljubinko Kevac, Mirjana Filipovic, „PRECISE TRAJECTORY TRACKING OF ROBOTIC MECHANISM", Scientific Review, Series: Scientific and Engineering, Special Issue Nonlinear Dynamics Dedicated to Milutin Milankovic (1879-1958), Serbian Scientific Society, Belgrade 2013, pp. 419-428. ISSN 0350-2010.

Papers published in international journals

[1] Miomir Vukobratovic and Mirjana Filipovic, „Dynamic Accuracy of Robotic Mechanisms, Part 1: Parametric Sensitivity Analysis", Mechanism and Machine Theory, 2000, Vol. 35, No. 2, pp. 221-237.

[2] Mirjana Filipovic and Miomir Vukobratovic „Dynamic Accuracy of Robotic Mechanisms, Part 2: Simulation Experiments on Results Discussion", Mechanism and Machine theory, 2000, Vol. 35, No. 2, pp. 239-270.

[3] Mirjana Filipovic, Miomir Vukobratovic, „Contribution to modeling of elastic robotic systems", Engineering & Automation Problems, International Journal, September 23. 2006, Vol. 5, No 1, pp. 22-35.

[4] Mirjana Filipovic, Veljko Potkonjak, Miomir Vukobratovic: „Humanoid robotic system with and without elasticity elements walking on an immobile/mobile platform", Journal of Intelligent & Robotic Systems, International Journal, 2007, Volume 48, pp. 157 - 186.

[5] Mirjana Filipovic, Miomir Vukobratovic: „Complement of Source Equation of Elastic Line", Journal of Intelligent & Robotic Systems, International Journal, online April, June 2008, Volume 52, No 2, pp. 233 - 261.

[6] Mirjana Filipovic, Miomir Vukobratovic: „Expansion of source equation of elastic line", Robotica, International Journal, online April, November 2008, Volume 26, No 6, pp. 739-751.

[7] Mirjana Filipovic „New form of the Euler-Bernoulli rod equation applied to robotic systems", Theoretical and Applied Mechanics, Society Mechanics, Belgrade, 2008, Volume35, No. 4, pp. 381-406.

[8] Mirjana Filipovic, „Euler-Bernoulli Equation Based on the Knowledge of the Classical Dynamics", Engineering & Automation Problems, International Journal, 2009, No 1, pp. 18-34.

[9] Mirjana Filipovic, Ana Djuric, „Whole analogue between Daniel Bernoulli solution and direct kinematics solution", Theoretical and Applied Mechanics, Society Mechanics, Belgrade, 2010, Volume 37, No.1, Pages 49-78.

[10] Mirjana Filipovic, „Relation between Euler-Bernoulli Equation and Contemporary Knowledge in Robotics", Robotica, International Journal, Cambridge University Press, 2012, Vol. 30, No.1, pp. 1-13.

[11] Mirjana Filipovic, Ana Djuric, „Mathematical Model of the Aerial Robot base on its Geometric Relationship", FME Transactions, Scientific journal, Faculty of Mechanical Engineering, Belgrade, Serbia, ISSN: 1450-8230, Vol. 42, No. 2, pp. 133-142, 2014, doi: 10.5937/fmet1402133F.

[12] A. M. Djuric, V. Jovanovic, M. Filipovic, Lj. Kevac, (2014), „The Reconfigurable Machinery Efficient Workspace Analysis Based on the Twist Angles", Special Issue on: Advanced Intelligent Systems and Mechatronics, International Journal of Computer Applications in Technology (IJCAT), accepted for publication in April 2014. Vol. 53, No.4, 2016.

[13] M. Filipovic, A. Djuric and Lj. Kevac, „The rigid S-type cable-suspended parallel robot design, modelling and analysis", Robotica, Available on CJO 2014 doi:10.1017/S0263574714002677, 2014. IF=0.894 ISSN 0263-5747, IF=0.894

[14] Mirjana Filipovic, Ana Djuric, Ljubinko Kevac, „The significance of adopted Lagrange principle of virtual work used for modeling aerial robots, Applied Mathematical Modelling 39 (2015), pp. 1804-1822, DOI information: 10.1016/j.apm.2014.09.019, ISSN 0307-904X, IF=2.158, 2015

Papers presented at the international conferences

[1] Mirjana Filipovic, „Influence off small variations of robot dynamic parameters on the accuracy of trajectory tracking", European Centre for Peace and Development, Vienna, Austria, September 1996, 480-485.

[2] Mirjana Filipovic, Miomir Vukobratovic, „Modeling of Flexible Robotic Systems", Computer as a Tool, EUROCON 2005, The International Conference, Belgrade, Serbia and Montenegro, Volume 2, 2005, pp. 1196 - 1199.

[3] Mirjana Filipovic, „Expansion of the Euler Bernoulli equation", Buletinul Universităţii „Politehnica", Seria Electrotehnica, Electronica si Telecomunicatii, Timisoara, Romania, Tomul 53 (67), 2008, Fascicola 1, 25-26 September 2008, pp. 27-32.

[4] Mirjana Filipovic, Miomir Vukobratovic, „New Interpretation of the Euler-Bernoulli Equation", 6th International

Symposium on Intelligent Systems and Informatics - SISY 2008, Subotica, Serbia, 26-27 September 2008.

[5] Mirjana Filipovic, „Elastic Deformation as a Result of the Total Dynamics of the System Movements“, 2nd International Congress of Serbian Society of Mechanics (IConSSM 2009), Palic (Subotica), Serbia, 1-5 June 2009, A-07, pp. 1-14.

[6] Mirjana Filipovic, „ Elastic Robotic System with Analysis of Collision and Jamming „, 7th International Symposium on Intelligent Systems and Informatics - SISY 2009, Subotica, Serbia, 25-26 September 2009.

[7] Mirjana Filipovic, „ Euler-Bernoulli Equation Today „, IROS 2009: IEEE/RSJ International Conference on Intelligent Robots and Systems, St. Louis, MO, USA, 11-15 October 2009, pp. 5691-5696.

[8] Mirjana Filipovic, „ Contribution to Expansion of the Euler Bernoulli Equation and its Solution, 8th International Symposium on Intelligent Systems and Informatics - SISY 2010, Subotica, Serbia, 10-11 September 2010.

[9] Mirjana Filipovic, „ Euler-Bernoulli equation forever but now in a new form, 9th International Symposium on Electronics and Telecommunications, ISETC 2010, Ninth Edition, Timisoara, Romania, November 11-12, 2010.

[10] Mirjana Filipovic, „ Euler-Bernoulli Equation Two and a Half Centuries Later“, 5th European Conference, ECCSC 2010, Belgrade, Serbia, November 23-25, 2010, pp. 306-309.

[11] Mirjana Filipovic, „ The Procedure for the Application of a New Form of Euler-Bernoulli Equation and Its Solutions”, 9th International Symposium on Intelligent Systems and Informatics - SISY 2011, Subotica, Serbia, September 2011. pp. 85-90, 2011.

[12] Mirjana Filipovic, „Coupling between motor motion of Cable-suspended Parallel Robot”, XI International Scientific – Professional Symposium INFOTEH-JAHORINA 2012, Faculty of Electrical Engineering, East Sarajevo, Bosnia and Herzegovina, pp. 481-486, 21-23 March 2012.

[13] Mirjana Filipovic, „The purpose of the development of the Euler-Bernoulli equation ”, XI International Scientific – Professional Symposium INFOTEH-JAHORINA 2012, Faculty of Electrical Engineering, East Sarajevo, Bosnia and Herzegovina, pp. 497-502, 21-23 March 2012.

[14] Mirjana Filipovic, Ana Djuric, Ljubinko Kevac „Contribution to the modeling of Cable-suspended Parallel Robot hanged on the four points”, IROS 2012: IEEE/RSJ International Conference on Intelligent Robots and Systems, Vilamoura, Institute for System and Robotics, University of Coimbra, Portugal, 3526-3531, October 7-12, 2012.

[15] Mirjana Filipovic, Ljubinko Kevac and Branimir Reljin, „Comparative analysis of two configurations of aerial robot,“ 2012 SISY IEEE 10th Jubilee International Symposium on Intelligent Systems and Informatics, Subotica, Serbia, Obuda University, Hungary, 211-216, September 20-22, 2012.

[16] Ljubinko Kevac and Mirjana Filipovic, „Trajectory tracking algorithm for elastic robotic mechanism,“ 2012 SISY IEEE 10th Jubilee International Symposium on Intelligent Systems and Informatics, Subotica, Serbia, Obuda University, Hungary, (September 20-22, 2012) 221-225

[17] Mirjana Filipovic, „Mathematical model of aerial robots as the basis for new research”, Symposium Non-linear Dynamics with Multi and Interdisciplinary Applications (SNDMIA 2012), Belgrade, Serbian Scientific Society, Booklet of Abstracts, Symposium Venue at Mathematical Institute SANU (Eight Serbian Symposium in area of Non-linear Sciences), 01-05 October 2012.

[18] Ljubinko Kevac, Mirjana Filipovic, „Precise trajectory tracking of robotic mechanism”, Symposium Non-linear Dynamics with Multi and Interdisciplinary Applications (SNDMIA 2012), Belgrade, Serbian Scientific Society, Booklet of Abstracts, Symposium Venue at Mathematical Institute SANU (Eight Serbian Symposium in area of Non-linear Sciences) 01-05 October 2012.

[19] Mirjana Filipovic, Ljubinko Kevac, Ana Djuric, „Future directions for implementation of aerial robot”, 10th International Symposium on Electronics and Telecommunications, ISETC 2012, Tenth Edition, Politehnica University of Timisoara, Timisoara, Romania, November 15-16, 2012.

[20] Mirjana Filipovic, Ana Djuric, Ljubinko Kevac, „The mathematical model of aerial robot in purpose increasing of its autonomy”, 20th Telecommunications Forum TELFOR 2012, Telecommunications Society, Belgrade, Serbia, November 20-22, 2012.

[21] Mirjana Filipovic, „The dynamic response of the Cable-suspended Parallel Robot hanged on the four points and powered by four motors”, INFOTEH-JAHORINA, Bosnia and Herzegovina, Vol. 12, 20-22 March 2013, pp. 520-525.

[22] Mirjana Filipovic, „Cable-suspended Parallel Robot hanged on the four points and powered by four motors – reference frame ”, INFOTEH-JAHORINA, Bosnia and Herzegovina, Vol. 12, 20-22 March 2013, pp. 514-519.

[23] Ljubinko Kevac, Ana Djuric, Mirjana Filipovic, Relation between Cable-suspended Parallel Robot and classic robotic structure, 4th International Congress of Serbian Society of Mechanics, Vrnjacka Banja, Serbia, 4-7 June 2013, pp. 955-960.

[24] Ana Djuric, Mirjana Filipovic, Wen Chen, Visualization of the three critical spaces related to the 6-DOF machinery,

4th International Congress of Serbian Society of Mechanics, Vrnjacka Banja, Serbia, 4-7 June 2013, pp. 915-920.

[25] Ana Djuric, Mirjana Filipovic, Ljubinko Kevac, „Graphical Representation of the Significant 6R KUKA Robots Spaces", 2013 SISY IEEE 11th 11th International Symposium on Intelligent Systems and Informatics, Subotica, Serbia (September 26-28, 2013, pp. 221-226.

[36] Ana Djuric, Jill Urbanic, Mirjana Filipovic, Ljubinko Kevac, „Effective Work Region Visualization for Serial 6 DOF Robots", 5th International Conference on Changeable, Agile, Reconfigurable and Virtual Production (CARV 2013), 6th to 9th of October 2013, Munich, Germany 2013, pp. 207-212, DOI: 10.1007/978-3-319-02054-9_36.

[27] Ana Djuric, Mirjana Filipovic, Ljubinko Kevac, Jill Urbanic, „Singularity Analysis for a 6 DOF Family of Robots", 5th International Conference on Changeable, Agile, Reconfigurable and Virtual Production (CARV 2013), 6th to 9th of October 2013, Munich, Germany 2013, pp. 201-206, DOI: 10.1007/978-3-319-02054-9_36.

[28] Ljubinko Kevac, Aleksandar Rodic, Mirjana Filipovic, „Control of two-axis solar tracker for increasing the autonomy of mobile robot", Second International Conference on Renewable Electrical Power Sources, 16th to 18th of October 2013 in Belgrade, Serbia.

[29] Mirjana Filipovic, „Comparative analysis of two types of Cable-suspended Parallel Robots, RSCPR system and RFCPR system", INFOTEH-JAHORINA, Bosnia and Herzegovina, Vol. 13, 19-21 March 2014, pp. 1057-1062, ISBN 978-99955-763-3-2.

[30] Mirjana Filipovic, „Relationship between external and internal forces for RSCPR and RFCPR systems", INFOTEH-JAHORINA, Bosnia and Herzegovina, Vol. 13, 19-21 March 2014, pp 1069-1074, ISBN 978-99955-763-3-2.

[31] Mirjana Filipovic, Ana Djuric, , Ljubinko Kevac „Complexity of the elastic S-type Cable-suspended Parallel Robot", Proceedings of 1st International Conference IcETRAN Conference, Vrnjacka Bamja, Serbia, June 2 – 5, 2014 , ROI3.3, pp. 1-6, ISBN 978-86-80509-70-9.

[32] Ljubinko Kevac, Mirjana Filipovic, Ana Djuric „The comparison between the real and the scaled model of the CPR system", Proceedings of 1st International Conference IcETRAN Conference, Vrnjacka Bamja, Serbia, June 2 – 5, 2014 , ROI3.2, pp. 1-6, ISBN 978-86-80509-70-9
http://etran.etf.rs/...

[33] Mirjana Filipovic, Ana Djuric, Ljubinko Kevac, „The choice of generalized coordinates for elastic robotic systems (industrial, humanoid and Cable-Suspended Parallel Robot) ", International Symposium on Stability, Vibration, and Control of Machines and Structures, SVCS2014, July 3–5, 2014, pp. 249-269, Belgrade, Serbia.

[34] Ljubinko Kevac, Mirjana Filipovic, Ana Djuric, "The dynamic response analysis of a 2-DOF robotic mechanism for a complex trajectory", International Symposium on Stability, Vibration, and Control of Machines and Structures, SVCS2014, July 3–5, 2014, pp. 270-284, Belgrade, Serbia.

[35] Ljubinko Kevac, Mirjana Filipovic, Ana Djuric, "The complex motion of Cable-suspended parallel robot under the influence of the disturbance", ENOC 2014, July 6 – 11, 2014, Vienna, Austria.

[36] Mirjana Filipovic, Ana Djuric, Ljubinko Kevac, Zeljko Despotovic, „ The elastic F-type Cable-suspended Parallel Robot in the service of parents", International Workshop and Summer School on Medical and Service Robotics, July 10 – 12 2014, EPFL Lausanne, Switzerland.

[37] Mirjana Filipovic, Ljubinko Kevac, Ana Djuric, Milica Vujovic „The importance of the development and application areas of different structures of Cable-suspended Parallel Robot – CPR systems," Proceedings of 2st International Conference IcETRAN Conference, Silver Lake, Serbia, June 8 – 11, 2015 , ROI3.6.

[38] Ljubinko Kevac, Mirjana Filipovic, „ANALYSIS OF THE PERFORMANCE OF CPR SYSTEM WITH CHANGEABLE MASSES OF WINCHES AND ROPES" Proceedings of 5th International Congress of Serbian Society of Mechanics, Arandjelovac, Serbia, June 15-17, 2015, M2b.

Invited lecture at the international conferences

[1] Mirjana Filipovic, „Construction type Cable-Suspended Parallel Robot, CPR system conditions the complexity of its mathematical model", International Symposium on Stability, Vibration, and Control of Machines and Structures, SVCS2014, July 3–5, 2014, 33-56, Belgrade, Serbia.

Papers published in domestic journals

[1] Mirjana Filipovic, Veljko Potkonjak and Miomir Vukobratovic: „Elasticity in Humanoid Robotics", Scientific – Technical Review, Military Technical Institute, Belgrade, 2007, Volume 1, Pages 24-33.

[2] Mirjana Filipovic „Dynamic of Biped Movement on a Mobile Platform in the Presence Elasticity Elements", Scientific – Technical Review, Military Technical Institute, Belgrade, 2008, Volume 1, Pages 15-24.

[3] Mirjana Filipovic „New View of the Euler-Bernoulli Equation", Scientific – Technical Review, Military Technical Institute, Belgrade, 2009, Volume 1, Pages 41-51.

[4] Mirjana Filipovic, Vladimir Kokotovic „ Contribution to New Interpretation of the Euler-Bernoulli Equation", FACTA UNIVERSITATIS Series Mechanics, Automatic Control and Robotics, 2009, Volume 8, No. 1, pp. 137-147.

[5] Mirjana Filipovic „Analogue between New Formulation of Euler-Bernoulli Equation and Algorithm of Forming Mathematical Models of Robot Motion", Scientific – Technical Review, Military Technical Institute, Belgrade, 2010, Vol. LX, No. 1, pp. 19-29.

[6] Mirjana Filipovic „New Aspects on Formulating the Euler-Bernoulli Equation", TECHNIQUE, Association of Mechanical and Electrical Engineers and Technicians of Serbia, Mechanical engineering 59 (2010) 4, pp. 1-8.

[7] Mirjana Filipovic „New access in the synthesis and analysis of movement of elastic link in the frame of robotics configuration", IMK – 14, Research and Development, Krusevac, Serbia, XVI, No. 37, 4/2010, pp. 7-12.(in Serbian)

[8] Mirjana Filipovic, „Differences between source and new form of the Euler-Bernoulli equation as well as its solution", FACTA UNIVERSITATIS Series: Physics, Chemistry and Technology, Nis, ISSN 0354 – 4656, Vol. 8, No 1, 2010, pp. 45-56.

[9] Mirjana Filipovic, „The Importance of Modelling an Aerial Robotic Camera", Scientific – Technical Review, Military Technical Institute, Belgrade, ISSN 1820-0206, 2012, Vol. 62, No. 1, pp. 28-37.

[10] Mirjana Filipovic, Ana Djuric, Ljubinko Kevac, „Influence of the construction type of Cable-suspended Parallel Robot on its kinematic and dynamic model", Scientific – Technical Review, Military Technical Institute, Belgrade, ISSN 1820-0206, 2013, Vol. 63, No. 4.

[11] Mirjana Filipovic, Ana Djuric, Ljubinko Kevac, „The methodology for developing the kinematic model of selected CPR-A system as a necessity for the development of a dynamic model", Journal of Applied Engineering Science, 2013, Paper number: 11(2013)4, 264, pp.191-200, doi:10.5937/jaes11-4581.

Papers presented at the domestic conferences

[1] Mirjana Filipovic, „Synthesis of robot motion control using Kalman filter as an estimator of unknown mass", Proceedings of the Yugoslav ETRAN Conference, Zlatibor , Yugoslavia, June 1995, pp. 264-267.(in Serbian)

[2] Mirjana Filipovic, „Influence of the robot dynamic parameters variations on the trajectory tracking accuracy", Proceedings of the Yugoslav ETRAN Conference, Budva, Yugoslavia, June 1996, pp. 247-250.(in Serbian)

[3] Mirjana Filipovic, „Model errors of trajectory tracking for dynamical control law ", Proceedings of the 42. Yugoslav ETRAN Conference, Vrnjčka Banja, Yugoslavia, June 1998, pp. 301-304.(in Serbian)

[4] Mirjana Filipovic, „Robotic systems in contact tasks of cutting process workpiece with spacious dynamic environment model", Proceedings of the 43. Yugoslav ETRAN Conference, Zlatibor, Yugoslavia, June 1999.(in Serbian)

[5] Mirjana Filipovic, „Extended mathematical model of dynamic environment in contact robotic tasks", Proceedings of the 44. Yugoslav ETRAN Conference, Sokobanja, Yugoslavia, June 2000, pp. 289-292.(in Serbian)

[6] Mirjana Filipovic, „Introduction of second mode of elastic robot segment into an robot system modelling and analysis", Proceedings of the 47. ETRAN Conference, Herceg-Novi, Serbia & Montenegro, June 2003, Vol.4, pp. 367-370.(in Serbian)

[7] Aleksandar Rodic, Miomir Vukobratovic, Mirjana Filipovic, Duško Katic, "Modellling and Simulation of Locomotion Mechanisms of Anthropomorphic Structure Using Contemporary software tools", Proceedings of the 47. ETRAN Conference, Herceg-Novi, Serbia & Montenegro, June 2003, Vol.4, pp.347-350.

[8] Mirjana Filipovic, „Structure of elastic robotic systems", Proceedings of the 6th DQM-2003 Dependability and Quality Management, Belgrade, Serbia & Montenegro, June 2003, pp. 809-814.(in Serbian)

[9] Mirjana Filipovic, D.Katic, A.Rodic, „An Analysis of Movement of the Flexible Robotic System in Horizontal Plane", Proceedings of the 7th DQM-2004 Dependability and Quality Management, Belgrade, Serbia & Montenegro, June 2004.

[10] Mirjana Filipovic, Aleksandar Rodic i Duško Katic, "An Analysis of Movement of Elastic Robotic System under the influence of environment dynamics", Proceedings of 29. HIPNEF 2004, Vranjačka Banja, Serbia & Montenegro, May 2004.pp.385-390.

[11] Mirjana Filipovic, Milovan Zivanovic, „Humanoid robotic system with possibility of the joint type selection: flexible or rigid", Proceedings of 48. Serbian Conference for ETRAN, Čačak, Serbia and Montenegro, pp. 253-256, 6-10 Jun 2004.(in Serbian)

[12] Miloš Zivanovic, Milovan Zivanovic, Mirjana Filipovic, „Proposal error tracking law with respect velocities or force of mechanical system", Proceedings of 48. Serbian Conference for ETRAN, Čačak, Serbia and Montenegro, pp. 281-284, 6-10 Jun 2004.(in Serbian)

[13] Mirjana Filipovic, Milovan Zivanovic, „Coupling between Platform and Biped", 49. Serbian Conference for ETRAN, Belgrade, Serbia and Montenegro, 5-10 June 2005, Vol. IV, pp. 349-352.

[14] Aleksandar Rodic, Duško Katic, Mirjana Filipovic, „Control of Dynamic Balance and Trunk Posture of Humanoid Robots in Service Tasks", 49. Serbian Conference for ETRAN, Belgrade, Serbia and Montenegro, 5-10 June 2005, Vol. IV, pp. 345-348.

[15] Mirjana Filipovic: „An analysis of movement of the flexible robotic system in „horizontal plane", 30. Congress with international participation, HIPNEF 2006, Vrnjacka Banja, Serbia and Montenegro, 24-26 May 2006, pp. 357-362.

[16] Mirjana Filipovic: „The humanoid robotic systems with elastic and stiff elements", Proceedings of 50. Serbian Conference for ETRAN, Belgrade, Serbia and Montenegro, 6-8 June 2006, Vol. IV.

[17] Mirjana Filipovic, Veljko Potkonjak, Miomir Vukobratovic: „Elastic humanoid robotic systems walking on an mobile platform", Proceedings of 51. Serbian Conference for ETRAN, Herceg Novi-Igalo, June 2007, RO1.1, 4-8.

[18] Mirjana Filipovic, „Expansion of Euler-Bernoulli equation and its application", Proceedings of 52. Serbian Conference for ETRAN, Palic, June 2008, RO1.1, 8-12.

[19] Mirjana Filipovic, „APPLICATION OF THE EULER BERNOULLI EQUATION", 31. Congress with international participation, HIPNEF 2008, Vrnjačka Banja, Serbija, 15-17. October 2008, pp. 399-404.

[20] Mirjana Filipovic, „New form of Euler-Bernoulli equation and mathematical model of motor", Proceedings of 53. Serbian Conference for ETRAN, Vrnjačka Banja, June 2009, RO1.1, 15 -18.

[21] Mirjana Filipovic, „GENERAL FORM OF EULER-BERNOULLI EQUATION AND MATEMATICAL MODEL OF MOTOR", 32. Congress with international participation, HIPNEF 2009, Vrnjačka Banja, Serbia, 15-17. October 2009, pp. 287-292.

[22] Mirjana Filipovic, „Procedure of Definding Euler-Bernoulli Equation", Proceedings of 54. Serbian Conference for ETRAN, Donji Milanovac, Serbia, June 7–11, 2010.

[23] Mirjana Filipovic, Svemir Popic, Miloš Jovanovic i Aleksandar Rodic: „Workspace Observation System", 24. International Congress on Process Industry, PROCESING 2011, Fruška Gora 01-03, Jun 2011.

[24] Mirjana Filipovic, „Procedure of Definding Euler-Bernoulli Equation", Proceedings of 55. Serbian Conference for ETRAN, Banja Vrucica (Teslic), 6 - 9. Jun 2011.

[25] Svemir Popic, Aleksandar Rodic, Mirjana Filipovic, „Robotized aerial-cable visual system for 3D surveillance and monitoring of scenic and protected areas", Proceedings of 55. Serbian Conference for ETRAN, Banja Vrucica (Teslic), 6 - 9. Jun 2011. RO2.4-1-4.

[26] Ljubinko Kevac, Mirjana Filipovic, „Application of FUZZY logic controller to the control of robotic mechanism", Proceedings of 56th ETRAN Conference, Zlatibor, Society for Electronics, Telecommunications, Computers, Automatic Control and Nuclear Engineering, June 11-14, 2012, RO1.7.

[27] Mirjana Filipovic, „Analysis and synthesis of aerial robot", Proceedings of 56th ETRAN Conference, Zlatibor, Society for Electronics, Telecommunications, Computers, Automatic Control and Nuclear Engineering, June 11-14, 2012, RO1.7.

[28] Mirjana Filipovic, Ljubinko Kevac, „The Importance of procedure of form a mathematical model of aerial robot," HIPNEM 2012, KGH, Belgrade, October 18 2012, ISBN 978-86-81505-64-9.

[29] Ljubinko Kevac, Mirjana Filipovic, „Application of fuzzy logic controller to the control of robotic mechanism with 6 DOF," HIPNEM 2012, KGH, Belgrade, October 18 2012.

[30] Mirjana Filipovic, Ljubinko Kevac, Ana Djuric, „Synthesis and analysis of two configurations of Cable-suspended Parallel Robot", Proceedings of 57th ETRAN Conference, Zlatibor, Serbia, June 3 – 6, 2013, RO2.5.

[31] Ljubinko Kevac, Mirjana Filipovic, Ana Djuric, „Analysis of influence of the motor choice on trajectory tracking of Cable-suspended Parallel Robot", Proceedings of 57th ETRAN Conference, Zlatibor, Serbia, June 3 – 6, 2013, RO2.5.

Technical Solutions and Software Products

[1] Mirjana Filipovic, Program system, FLEXI: „ Humanoid robotic system with rigid and elastic elements that walks on immobile/mobile platform", 2007.
http://www.pupin.rs/RnDProfile/filipovic-pub.html#ref7

[2] Mirjana Filipovic, Program system, EBTLOM „Euler-Bernoulli Theory Link One Mode", 2009.
http://www.pupin.rs/RnDProfile/filipovic-pub.html#ref7

[3] Mirjana Filipovic, Program system, TMODES „New form of the Euler-Bernoulli equation in presence of high modes (Two MODES)", 2010.
http://www.pupin.rs/RnDProfile/filipovic-pub.html#ref7

[4] Mirjana Filipovic, Program system, TIPEX „Robotic Example in Vertical Plane with Elastic Gear and Flexible Link in the Presence of the Second Mode and Dynamic External Force", 2011.
http://www.pupin.rs/RnDProfile/filipovic-pub.html#ref7

[5] Mirjana Filipovic, Program system, VERSPACE „The spatial movement of the vertical elastic links", 2011.
http://www.pupin.rs/RnDProfile/filipovic-pub.html#ref7

[6] Mirjana Filipovic, Program system, AIRCAMA „ Cable Suspended Parallel Robot, CPR-A", 2012.
http://www.pupin.rs/RnDProfile/filipovic-pub.html#ref7

[7] Mirjana Filipovic, Program system, AIRCAMB „ Cable Suspended Parallel Robot, CPR-B", 2012.
http://www.pupin.rs/RnDProfile/filipovic-pub.html#ref7

[8] Mirjana Filipovic, Program system, AIRCAMC „ Cable Suspended Parallel Robot, CPR-C", 2012.
http://www.pupin.rs/RnDProfile/filipovic-pub.html#ref7

[9] Mirjana Filipovic, Program system, AIRCAMD „ Cable Suspended Parallel Robot, CPR-D", 2012.
http://www.pupin.rs/RnDProfile/filipovic-pub.html#ref7

[10] Mirjana Filipovic, Program system, ORVER, for RFCPR system, Rigid ropes F-type Cable-suspended Parallel Robot, 2013.
http://www.pupin.rs/RnDProfile/filipovic-pub.html#ref7

[11] Mirjana Filipovic, Program system, ORIGI, for RSCPR system, Rigid ropes S-type Cable-suspended Parallel Robot, 2013. http://www.pupin.rs/RnDProfile/filipovic-pub.html#ref7

[12] Mirjana Filipovic, Program system, **ORFLEX,** „elastic ropes S-type Cable-suspended Parallel Robot, **eSCPR**, with one mode", 2014. http://static.pupin.rs/2010/07/ORFLEX_Za_Saj_2014_MF.pdf

[13] Mirjana Filipovic, Program system, **OGIFLEX**, „elastic ropes F-type Cable-suspended Parallel Robot, **eFCPR,** with one mode", 2014. http://static.pupin.rs/2010/07/OGIFLEX_Za_Saj_2014_MF.pdf

[14] Mirjana Filipovic, Program system, **OGTOM,** „elastic ropes S-type Cable-suspended Parallel Robot, **eSCPR,** with two modes", 2014. http://static.pupin.rs/2010/07/OGTOM_Za_Saj_2014_MF.pdf

[15] Mirjana Filipovic, Program system, **OVTOM,** „elastic ropes F-type Cable-suspended Parallel Robot, **eFCPR,** with two modes", 2014. http://static.pupin.rs/2010/07/OVTOM_Za_Saj_2014_MF.pdf

Patents

[1] Patent No. A-205/02/1, Analysis and Synthesis of Flexible Robotic Systems.

[2] Patent No. A-117/04/1, Modelling of Elastic Robotic Systems.

Annex 2 : Mirjana Filipovic: List of projects: Member of research team and/or project manager

LIST OF R&D PROJECTS

- The development of cells and systems of high automated and robotized capacities for packing in food industry, 1998-2000, a team member.
- Use of IR heaters within ceramic product drying process, 2001.
- Simulation and Experimental Platform for Design and Control of Service Robots, Ministry of Science and Technology of Republic of Serbia, 2001-2004
- Dynamics and Control of High Performance Humanoid Robots – Theory and Application, Ministry of Science and Technology of Republic of Serbia, 2005-2007
- Development of High Performance Humanoid Robots, Innovation Project, Ministry of Science and Technology of

Republic of Serbia, 2006-2007

- Humanoid Robotic Systems – Theory and Application, Ministry of Science and Technology of Republic of Serbia, 2008-2010
- Ambient Intelligent Service Robots of Anthropomorphic Characteristics, Ministry of Education and Science of Republic of Serbia TR 35003, 2011-2015
- Creative Alliance in Robotics Research and Education Focused on Medical and Service Robotics (CARE-Robotics), IZ74Z0_137361/1, Swiss National Science Foundation (SNSF), Scientific Cooperation between Eastern Europe and Switzerland (SCOPES program), 2011-2014