

Editor's Award

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EDITOR'S AWARD

The editorial board of the *Kybernetika* journal has decided to found the honorary "Editor's Award," to be granted annually to the authors of one or two papers published during the respective year. The aim of establishing the award is to consequently increase the prestige of publishing in our journal. The procedure is rather simple, namely, a committee appointed by the editor-in-chief selects the winner(s) based on proposals from the responsible members of the editorial board.

For the year 2012 two papers were selected:

G. Morvai and B. Weiss. *A note on prediction for discrete time series.* *Kybernetika* **48** (2012), 4, 809–823.

M. Mendoza, I. Bonilla, F. Reyes, and E. González-Galván. *A Lyapunov-based design tool of impedance controllers for robot manipulators.* *Kybernetika* **48** (2012), 6, 1136–1155.

The first paper, *A note on prediction for discrete time series*, deals with the non-parametric prediction of discrete time series taking values in a finite or countably infinite set. The distribution of the process is otherwise unknown. The authors construct a sequence of stopping times λ_n along which they are able to estimate the conditional expectations $E(f(X_{\lambda_{n+1}})|X_0, \dots, X_{\lambda_n})$ from the observations $(X_0, \dots, X_{\lambda_n})$ in a point-wise consistent way for a class of stationary and ergodic time series. In that case the stopping time is polynomial in the length of the sequence. If further assumptions are also satisfied - such as when the time series is a finite Markov chain or it is an i.i.d. sequence - then the stopping time depends on n linearly.

The editors appreciated the paper as a highly mathematical contribution that perfectly represents one of *Kybernetika* journals crucial topics. The authors are true experts in the area. The paper provides new results that solve some open problems. By way of illustration, let us quote one of the referee comments:

"In the paper authors consider the problem of estimating the conditional expectations using an algorithm which involves a scheme for discriminating processes. In fact, it is a particular case of the well-known problem of non-parametric prediction. In spite of numerous papers, there are some open questions in the field and the authors consider one of them. That is why the considered paper can be interesting for readers of *Kybernetika*."

The second paper, *A Lyapunov-based design tool of impedance controllers for robot manipulators* presents a design tool of impedance controllers for robot manipulators, based on the formulation of Lyapunov functions. The proposed control approach addresses two challenges: the regulation of interaction forces, ensured by the impedance error converging to zero, while preserving a suitable path tracking despite constraints imposed by the environment. The asymptotic stability of an equilibrium point of the system, composed of full nonlinear robot dynamics and impedance control, is demonstrated according to Lyapunov's direct method. The system's performance was tested through the real-time experimental implementation of an interaction task involving a direct-drive robot with two degrees of freedom.

Our editors appreciated the paper as a significant and nicely written contribution to the area of control theory which is one of the important topics within *Kybernetika* scope. The paper is equipped with a strong theoretical background and has obvious application potential. The team of authors is still rather young and apparently quite promising.

To quote one of the referees:

“The article presents the design of a control strategy for robotic manipulators. The strategy presented doesn't neglect the constraints imposed by the environment. The environment is modeled as an object with high mechanical impedance. The article is very clear and it is possible to understand everything without too much effort. The proposed control strategy is further supported by the real-time laboratory experiment.”

Let us briefly introduce here the authors of the awarded papers.

Gustáv Morvai received an M.Sc. in Electrical Engineering and a Ph.D. in Applied Mathematics from the Technical University of Budapest (BME) in 1991 and 1996, respectively. Presently, he is a senior researcher at the MTA-BME Stochastics Research Group (Budapest, Hungary). He received the Géza Grünwald memorial prize from the Bolyai János Mathematical Society in 1997. Gusztáv Morvai (with Benjamin Weiss) received the 2005 Prix de l'Institut Henri Poincaré. His main fields of interest are non-parametric statistics, sequential estimation, information theory and discrimination of processes.

Benjamin Weiss was born in New York in 1941. He received a Ph.D. degree from Princeton University in 1965 (advisor: William Feller). In the period 1965-67 he was a staff member with IBM Research. He has been with the Institute of Mathematics, Hebrew University of Jerusalem, Israel since 1967, in the capacity of Prof. Emeritus there since 2009. In 2000 he was elected to the American Academy of Arts and Sciences as a Foreign Honorary Member; in 2001 he gave a Plenary Lecture at the IEEE Conference on Information Theory, Washington DC. In 2006 he received the Rothschild Prize in Mathematics. His current research interests include ergodic theory, topological dynamics, probability theory and information theory.

Marco Mendoza was born in Guadalajara, Mexico, on November 22, 1981. He received a B.S. degree in Communications and Electronics Engineering from the University of

Colima (Colima, Mexico) in 2003, an M.S. degree in Electronics from the Autonomous University of Puebla (Puebla, Mexico) in 2006, and the Ph.D. degree in electrical engineering from the Autonomous University of San Luis Potosi (San Luis Potosi, Mexico), in 2011. From 2011 to 2012, he was an Associate Professor with the University of Sonora (Sonora, Mexico). He is currently a Professor of Control Systems and Power Electronics with the Faculty of Sciences, Autonomous University of San Luis Potosi. His current research interests include adaptive control, impedance and force control, teleoperation, and rehabilitation robotics.

Isela Bonilla was born in Mexico City on January 29, 1975. She received a B.S. degree in Communications and Electronics Engineering from the University of Colima, Colima, Mexico in 2003, an M.S. degree in Electronics from the Autonomous University of Puebla (Puebla, Mexico) in 2006, and a Ph.D. degree in Electrical Engineering from the Autonomous University of San Luis Potosi (San Luis Potosi, Mexico) in 2011. In 2011, she was an Associate Professor with the University of Sonora (Sonora, Mexico). In 2012, she joined the Autonomous University of San Luis Potosi, where she is currently a Professor and Researcher. Her current research interests include impedance and force control, biomedical engineering, and rehabilitation robotics.

Fernando Reyes was born in Puebla, Mexico, on March 7, 1962. He received a B.S. degree in Electronics Engineering from the Autonomous University of Puebla (Puebla, Mexico) in 1984, an M.S. degree from the National Institute of Astrophysics, Optics and Electronics, Puebla, in 1989, and a Ph.D. degree in Electronics from the Center for Scientific Research and Higher Education of Ensenada Research Center (Ensenada, Mexico), in 1997. In 1980, he joined the Autonomous University of Puebla, where he is currently a Professor and Researcher. He has published two books and more than 250 scientific papers in national and international conferences and journals. His research interests include the control of robot manipulators with special emphasis on practical applications.

Emilio J. González-Galván was born in Mexico City on April 24, 1965. He received Bachelor's and Master's degrees from the University of Guanajuato (Guanajuato, Mexico) in 1990 and 1991, respectively, and his Ph.D. degree from the University of Notre Dame (Notre Dame, IN) in 1995, all in Mechanical Engineering. From 1991 to 1996, he was a Fulbright scholar with the University of Notre Dame, where he became a Postdoctoral Fellow in 1996. From 2007 to 2008 he was a Visiting Scholar with the Massachusetts Institute of Technology. In 1996, he joined the School of Engineering, Autonomous University of San Luis Potosi (San Luis Potosi, Mexico), where he is currently a Professor and Researcher. Dr. González-Galván was the President of the Mexican Robotics Association from 2003 and 2005. His research interests include vision-based control, industrial robotics, mechanical design, and rehabilitation robotics.

It is our great pleasure to congratulate all of the authors.

Editorial Board