

# EE Department Seminars

January 18, 2010, Monday, 3 p.m.  
Yorgo I Stefanopulos Meeting Lounge (KB 217)

## Support Vector Machines-Based Generalized Predictive Control

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The Support Vector Machines (SVMs) approach has been becoming an extensively employed tool for solving regression and classification problems in the machine learning area of research. SVMs deliver state-of-the-art performance in real-world applications such as modeling, prediction and control of complex systems, and also text categorization, hand-written character recognition, image classification, bio-sequences analysis, etc. Now, they are established as one of the standard tools for machine learning. In this study, a fusion of the SVM and the well-known Generalized Predictive Control (GPC) approach are presented, which is referred to as the SVM-Based GPC method. In the method, unknown dynamics of the investigated nonlinear systems are captured by the SVM models and then they are used in the GPC framework. Numerical and experimental results have revealed that the SVM-Based GPC method can provide satisfactory control performance for different reference trajectories even under noisy conditions.

**Serdar İPLİKÇİ** received his BSc degree in Electronics and Communication Engineering from Technical University of Istanbul, Turkey in 1991, MSc degree in Systems and Control Engineering from Bogazici University, Istanbul, Turkey in 1999 and PhD degree in Electrical and Electronics Engineering from Bogazici University, Istanbul, Turkey in 2002, respectively. Since December 2002, he has been working at Pamukkale University, Dept. of Electrical and Electronics Engineering, Denizli, Turkey as Associate Professor. His main research interests are machine learning, model based control, intelligent control, nonlinear dynamics and chaos theory. His selected papers are:

- Iplikci, S., "A Comparative Study on a Novel Model-Based PID Tuning and Control Mechanism for Nonlinear Systems," *International Journal of Robust and Nonlinear Control*, in press.
- Iplikci, S., "Support Vector Machines Based Generalized Predictive Control," *International Journal of Robust and Nonlinear Control*, **16**, 843-862, 2006.
- Iplikci, S., "Online Trained Support Vector Machines Based Generalized Predictive Control of Non-linear Systems," *International Journal of Adaptive Control and Signal Processing*, **20**, 599-621, 2006.
- Iplikci, S., "Support Vector Machines Based Generalized Predictive Control of Chaotic Systems," *IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences*, **E89A**, 2787-2794, 2006.
- Iplikci, S., "Dynamic Reconstruction of Chaotic Systems from Inter-spike Intervals Using Least Squares Support Vector Machines," *Physica D*, **216**, 282-293, 2006.