



IEEE Greece Signal Processing Chapter

ΠΡΟΣΚΛΗΣΗ ΣΕ ΔΙΑΛΕΞΗ

Την Πέμπτη 9 Δεκεμβρίου, 12:00μμ, στο Αμφιθέατρο του Ερευνητικού Ακαδημαϊκού Ινστιτούτου Τεχνολογίας Υπολογιστών (EAITY, Κτίριο "Δ. Μαρίτσας", Πανεπιστημιούπολη Πατρών), θα πραγματοποιηθεί διάλεξη του κ. Σέργιου Θεοδωρίδη, Καθηγητή του Τμήματος Πληροφορικής & Τηλ/νιων του ΕΚΠΑ, IEEE Fellow και Distinguished Lecturer της IEEE Signal Processing Society.

Το θέμα της διάλεξης είναι:

"Adaptive Learning in a World of Projections"

Η διάλεξη συνδιοργανώνεται από το IEEE Greece Signal Processing Chapter, το Ενδοπανεπιστημιακό Δίκτυο Έρευνας και Εφαρμογών σε Ασύρματα Δίκτυα Επικοινωνιών & Αισθητήρων και την Ερευνητική Μονάδα 8 του EAITY.

Ακολουθεί βιογραφικό του ομιλητή και σύντομη περίληψη της ομιλίας.

Σύντομο βιογραφικό του ομιλητή:

Sergios Theodoridis is currently Professor of Signal Processing and Communications in the Department of Informatics and Telecommunications at the National and Kapodistrian University of Athens. His research interests lie in the areas of Adaptive Algorithms and Communications, Machine Learning and Pattern Recognition, Signal Processing for Audio Processing and Retrieval. He is the co-editor of the book "Efficient Algorithms for Signal Processing and System Identification", Prentice Hall 1993, the co-author of the book "Pattern Recognition", Academic Press, 4th Ed. 2009, co-author of the book "Introduction to Pattern Recognition: A MATLAB approach", Academic Press, 2010, and the co-author of three books in Greek, two of them for the Greek Open University.

He is the co-author of six papers that have received best paper awards, including the IEEE Computational Intelligence Society Transactions on Neural Networks Outstanding Paper Award. He currently serves as Distinguished Lecturer of the IEEE Signal Processing Society.

He has served as President of the European Association for Signal Processing (EURASIP) and he is currently a member of the Board of Governors for the IEEE Circuits and Systems (CAS) Society. He was the general chairman of EUSIPCO-98, the Technical Programme co-chairman of ISCAS-2006 and the Co-chairman of CIP-2008. He has served as an Associate Editor in all major Signal Processing related journals, including IEEE Transactions on Signal Processing, IEEE Signal Processing Magazine, IEEE Transactions on Neural networks, IEEE Transactions on Circuits and Systems, Signal Processing. He is currently the Editor-in-Chief of the EURASIP Signal Processing book series of Academic Press.

He was a member of the Greek National Council for Research and Technology and Chairman of the SP advisory committee for the Edinburgh Research Partnership (ERP). He has served as vice chairman of the Greek Pedagogical Institute and he was for four years member of the Board of Directors of COSMOTE (the Greek mobile phone operating company). He is Fellow of IET, a Corresponding Fellow of RSE and a Fellow of IEEE.

Τίτλος διάλεξης: Adaptive Learning in a World of Projections

ABSTRACT:

The task of parameter/function estimation has been at the center of scientific attention for a long time and it comes under different names such as filtering, prediction, beamforming, classification, regression. Conventionally, the task has been treated as an optimization task of an appropriately adopted loss function. However, in most of the cases, the choice of the loss function is mainly dictated by its mathematical tractability and not by a physical reasoning related to the specific problem at hand. The task is further complicated when a-priori information, in the form of constraints, becomes available. The presence of constraints in estimation tasks is recently gaining in importance, due to the revival of interest in robust learning schemes.

In this talk, the estimation task is treated in the context of set theoretic estimation arguments. Instead of a single optimal point, we are searching for a set of solutions that are in *agreement* with the available information, which is provided to us in the form of a set of training points and a set of constraints.

The goal of this talk is to present a *general* tool for parameter/function estimation, both for classification as well as regression tasks, in a time adaptive setting in (infinite dimensional) Reproducing Kernel Hilbert spaces (RKHS). The general framework is that of convex set theory via the powerful and elegant tool of projections.

The structure of this talk evolves along the following directions:

1. It presents in *simple* geometric arguments the basic principles behind the convex set theoretic approach via projections in the *generalized online* setting. In contrast to the classical POCS theory, developed for a fixed number of convex sets, we consider convex sets which are built “around” the training data, and thus their number increases as time evolves and new data samples are received.
2. It presents two case studies of particular interest in the adaptive learning community:
 - ✓ On line classification
 - ✓ Adaptive constrained regression in the context of robust beamforming.

The resulting algorithms are of *linear complexity* with respect to the number of unknown parameters and are supported by strong convergence results.

The work has been carried out in cooperation with Isao Yamada and Kostas Slavakis.
