

Department of Electrical and Computer Engineering

Title: «Extremum Problems with Total Variation Distance and their Applications»

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Room KENTP. A019, Old Campus – University of Cyprus

Abstract:

Extremum problems with total variation distance metric on the space of probability measures often arise in approximating high dimensional probability distributions by lower dimensional, entropy optimization, minimax stochastic control, and in problems of information and decision theory. In this seminar, such problems and their extremum solutions are discussed for abstract and finite alphabet spaces, and their fundamental water-filling properties and the partitioning of the alphabet spaces of the extremum solutions are investigated.

These results are applied to solve a number of problems that are of fundamental importance. *For minimax stochastic control*, we address optimality of stochastic control strategies on a finite and on an infinite horizon via dynamic programming subject to total variation distance ambiguity on the conditional distribution of the controlled process. New dynamic programming recursions, which codify the level of ambiguity, are derived, and new policy iteration algorithms are presented to compute the optimal strategies. *For Markov process approximation*, we approximate a finite state Markov process with a large number of states by a lower dimensional process. New iterative algorithms, which are applicable to a variety of approximation problems spanning optimal state reduction and optimal state aggregation, are proposed.

Biography:

Ioannis Tzortzis is a PhD student in the Department of Electrical and Computer Engineering at the University of Cyprus under the supervision of Prof. C.D. Charalambous. He recently defended his PhD thesis with title “Extremum Problems with Total Variation Distance Metric on the Space of Probability Measures and Applications”. He received his MSc degree in Electrical and Computer Engineering from the University of Cyprus in 2009, and his BSc degree in Electrical Engineering and Informatics from Budapest University of Technology and Economics, Hungary in 2007. In 2003 Ioannis received his HND from Higher Technical Institute, Cyprus in 2003. His research interests include control and optimization subject to uncertainty, stochastic systems, Markov processes, minimax dynamic games, dynamic programming and model order reduction.