

KIOS Distinguished Lecture Series



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Coordination and control in next generation energy systems

LECTURE ABSTRACT

Modern energy systems involve a large number of agents each with local decision making capabilities, that interact through their common use of shared resources. The mutual constraints imposed by the shared resources require the actions of the agents to be coordinated. This can be accomplished through the exchange of information about global considerations of the system, provided, for example, by a central aggregator who can impose prices on certain actions, or mutual constraints among the agents. In many cases the process is further complicated by the presence of uncertainty, for example about the weather, hence energy demand and renewable generation; in such cases, the decisions of the agents not only have to be coordinated with their peers, but also be robust against this uncertainty. In this talk we will discuss how such questions can be addressed using tools from distributed optimisation, robust optimisation, and game theory. The discussion will be motivated by applications to energy management in districts.

BRIEF BIO

John Lygeros completed a B.Eng. degree in electrical engineering in 1990 and an M.Sc. degree in Systems Control in 1991, both at Imperial College of Science Technology and Medicine, London, U.K.. In 1996 he obtained a Ph.D. degree from the Electrical Engineering and Computer Sciences Department, University of California, Berkeley. In July 2006 he joined the Automatic Control Laboratory at ETH Zurich, first as an Associate Professor, and since January 2010 as a Full Professor; he is currently serving as the Head of the laboratory. His research interests include modelling, analysis, and control of hierarchical, hybrid, and stochastic systems, with applications to biochemical networks, automated highway systems, air traffic management, energy systems, and camera networks. John Lygeros is a Fellow of the IEEE, and a member of the IET and the Technical Chamber of Greece; since 2013 he is serving as the Treasurer of the International Federation of Automatic Control.

