Preface

This volume contains the proceedings of the Workshop on Networked Embedded Sensing and Control (NESC) held at the University of Notre Dame, Notre Dame, Indiana, on October 17-18 2005 (`http://nesc.ee.nd.edu`). Networked embedded control systems can be roughly described as collections of spatially distributed sensors, actuators and controllers whose behavior is coordinated through wired or wireless communication links. This integration between different technologies and scientific domains presents new and challenging fundamental problems underlying the foundations of this class of systems. The workshop acted both as a forum and as a catalyst for a dialogue between over 60 researchers working on different aspects of networked systems, such as sensing and estimation, control, coding/communications and ad hoc networking. Different research experiences and results were exchanged among researchers, while concrete steps towards establishing the scientific foundations and identifying the main scientific challenges were given.

The workshop was organized as a single track event with 18 contributed papers over two days centered around four invited plenary lectures. The plenary lectures were "Motion coordination for multi-agent networks" by Francesco Bullo, University of California at Santa Barbara; "Embedded sensing and control: Applications and application requirements" by Tariq Samad, Honeywell; "Control over communication networks: Impact of delays on performance" by Dawn Tilbury, University of Michigan; and "The role of information theory in communication constrained control systems" by Sekhar Tatikonda, Yale University. The 18 contributed papers were presented in five sessions: Multi-Agent Control, Simulation and Implementation, Distributed Sensing, Filtering and Estimation, during the first day; Control over Networks I and Control over Networks II, during the second day of the workshop.

What emerged from this workshop was the importance of exploring further the areas between the disciplines of systems and control, information theory, communication networks, distributed and collaborative control, and real-time systems. At the same time it became clear that being aware of application needs that help incorporate the right assumptions in our theoretical results, as well as of implementation issues that assist us in the crafting of our algorithms, is necessary.

We are grateful to all invitees and contributors for making the workshop a success. We would also like to recognize the diligence and expertise of the Program Committee: John Baillieul, Boston University; Michael Branicky, Case Western Reserve University; Magnus Egerstedt, Georgia Institute of Technology; Nicola Elia, Iowa State University; Martin Haenggi, University of Notre Dame; João Hespanha, University of California at Santa Barbara; George J. Pappas, University of Pennsylvania; Sekhar Tatikonda, Yale University; Dawn Tilbury, University of Michigan.

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