

Sponsored by:



ISIE 2010 Bari IEEE International Symposium on Industrial Electronics **ITALY** 4-7 July 2010

TUTORIAL

Real-time operating systems for embedded applications

Presented by

Ivan Cibrario Bertolotti, *Member, IEEE, IEIIT-CNR*

Synopsis

The tutorial aims at describing the internal structure of real-time operating systems and the advantages of using them in the embedded applications domain. After a summary of several common issues concerning concurrent programming, the most widespread models and techniques for real-time scheduling and scheduling analysis of independent tasks are presented. Then, the tutorial will discuss how the synchronization and communication needs among real-time tasks are dealt with. An example of the unbounded priority inversion problem due to lock-based synchronization will lead to the description of the Priority Inheritance and Priority Ceiling algorithms. Then, a different approach to shared object access, not requiring locks and mutual exclusion to function, will be considered: lock and wait-free synchronization. Some remarks about the practical availability of the algorithms and software components discussed in the tutorial will conclude the talk, with a focus on open-source libraries and operating systems.

About the Speaker

Ivan Cibrario Bertolotti received his Laurea degree (summa cum laude) in computer science from the University of Turin, Italy, in 1996. Since then, he has been a researcher with the Italian National Research Council (IEIIT-CNR), Turin, Italy. Besides acting as a real-time operating system consultant with leading international industries, he has also been teaching introductory and advanced courses on the same topics at Politecnico di Torino, Turin, Italy. In the spring of 2009, he taught a short real-time operating system course at the Graduate School in Information Engineering, Ph.D. program, University of Padua, Italy. He is also author of three book chapters on the same topics.