



UNIVERSITY OF SOUTHERN CALIFORNIA

DEPARTMENT OF MATHEMATICS

CENTER FOR APPLIED MATHEMATICS SEMINAR

George Moustakides
University of Patras, Greece

*"Asynchronous random sampling for
decentralized detection"*

Abstract:

In decentralized detection, multiple sensors acquire information which is processed locally to produce discrete-time samples that are transmitted, at low rate, to a fusion center. The fusion center in turn collects this information from all sensors and uses it to make a sequential decision regarding a hypothesis testing or a change detection problem.

Depending on the computing capability of the sensors, the existence of feedback from the fusion center towards the sensors, we can define different models for the problem of decentralized detection. We first make a brief overview of the existing models and their optimum detection structures.

The performance of these test is then compared against the centralized test in which the fusion center has access to the complete set of information acquired by all sensors. We pay special attention to a specific class known as "sensors with full local memory" for which there was recently developed a detection scheme that approaches in performance the optimum centralized test. In the same spirit of this result we propose an alternative test that is characterized by a random sampling strategy at the sensors and a simple 1-bit asynchronous communication policy between sensors and fusion center. Our test is shown theoretically and with simulations to have performance which is very close to the performance of the optimum centralized test differing, at most, by a bounded constant.

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KAP 249
3:30 - 4:30 PM