

**Guest Lecture / Seminar:**

Dr. Claudio De Persis, Dept. of Computer and Systems Science, University of Rome "La Sapienza", Rome, Italy. Currently visiting : Center for Embedded Systems, Aalborg University, Aalborg, Denmark.

**Time:** Friday 20<sup>th</sup> August 2004, 11.15 – 12.15

**Place:** Room T2, Marinteknisk Senter/ CeSOS – Tyholt

**Title:** Nonlinear Control via Encoded Feedback

**Abstract:** In this talk we consider the problem of controlling nonlinear systems when sensors and actuators exchange information through a finite data-rate channel. The data rate constraint is usually strict and the traditional assumption on arbitrarily fast and accurate sampling does not hold any longer. Therefore, feedback information must be suitably encoded in order to avoid destabilizing effects due to the presence of the channel. We shall focus on the problem of (semi-)globally stabilizing nonlinear continuous-time systems using feedback processed by dynamic encoders. We show that any system which can be globally asymptotically stabilized by standard (i.e. with no encoding) feedback can also be (semi-)globally asymptotically stabilized by encoded feedback and an estimate of the data-rate needed to this purpose is provided. This data-rate in general will not be minimal. We then illustrate how to design a different class of encoders which leads to minimal data-rate (semi-)global stabilization results for the important class of nonlinear feed forward systems.