

## SESSION 2.9 - ADVANCED NUMERICAL MODELLING

### **Invited speech** - A LOCALLY RECURRENT NEURAL NETWORK BASED APPROACH FOR THE EARLY FAULT DETECTION

In this work, a fault detection approach for diagnosis of nonlinear systems is presented. This diagnostic approach is performed resorting to a neural predictor of the output of the system, and by using the error prediction as a feature for the diagnosis. The neural predictor is a locally recurrent neural network, which is dynamically trained by using a gradient-based algorithm, where the gradient of the error function is expressed in closed form. The residuals of the prediction are affected by the deviation of the parameters from their nominal values, so that an early detection of the faults can be performed by observing the dynamic of the residuals. The Willamoski-Rössler reaction is used as case study in order to validate the diagnostic approach.

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