

CRUNCH Seminars at Brown, Division of Applied Mathematics

Friday – November 30, 2018

Paper Review: Predicting Bending Displacement of IPMC Actuators Using Parallel Non-Autoregressive Recurrent Neural Networks

Guofei Pang

The high application potential of ionic polymer metal composites (IPMC) has made the behavior identification of this group of smart materials an attractive area. So far, several models have been proposed to predict the bending of an IPMC actuator, but these models have some weaknesses, the most important of which is the use of output data (in autoregressive models), high complexity to achieve a proper precision (in non-autoregressive models), and lack of compatibility with the behavioral nature of the material. In this paper, we present a hybrid model of parallel non-autoregressive recurrent networks with internal memory cells to overcome existing weaknesses. The validation results on experimental data show that the proposed model has an acceptable accuracy and flexibility. Moreover, simplicity and compatibility with the behavioral nature of the material promote using the proposed model in practical applications.