# Applied Mathematics Seminar

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh


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### Multistability in recurrent neural networks


Recurrent neural networks (RNNs) are computational models inspired by the brain. Although, RNNs stand out as state-of-the-art machine learning models to solve challenging engineering-oriented tasks as speech recognition, handwriting recognition, language translation, and others, they are plagued by the so-called vanishing/exploding gradient issue. This prevents us to train RNNs to learn long term dependencies. Other than that, a problem of interpretability affects these models, known as the "black-box issue" of RNNs. Exploiting excitable network attractors we propose a mechanistical model able to interpret the behaviour of RNNs when solving tasks involving switching dynamics between different attractors. Moreover, we investigate RNNs from a nonautonomous dynamical systems perspective and question a fundamental principle of Reservoir Computing, namely the Echo State Property.


Thursday, 11.03.2021 · 12pm online (via MS Teams)
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