SYDE 552 – Project Proposal

"Analyzing the Impact of Parameter Variation on Legendre Memory Unit Performance for Online Learning"

For this project, I intend to implement a Legendre Memory Unit (LMU) in Nengo following this online tutorial. I would like to extend this tutorial by examining the impacts of varying the q (number of Legendre polynomials forming the memory basis) and θ (memory window length) parameters of the LMU on some past-dependent function of the input, such as:

$$y(t) = \cos(x(t) + 2x(t-2))$$

I will measure the impact of parameter variation by assessing the error of the model over time and determining where it reaches some adequately accurate fit to the data, such as:

$$\epsilon(t) \leq (y(t) - \hat{y}(t))^2$$

By comparing the performance of the different parameter configurations, I aim to assess how the different attributes of the LMU contribute to the temporal performance of the network in relation to its input signal.