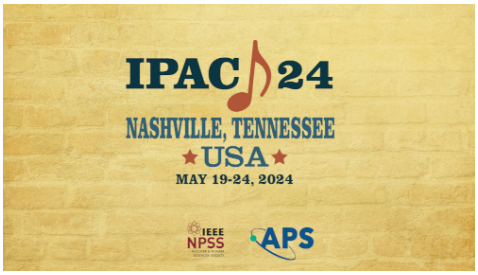

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Machine learning enabled model predictive control of the FRIB RFQ

Tuesday, 21 May 2024 16:00 (2 hours)

Efficient control of frequency detuning for the radio-frequency quadrupole (RFQ) at the Facility for Rare Isotope Beams (FRIB) is still challenging. The transport delay and the complicated heat transfer process in the cooling water control system convolute the control problem. In this work, a long-short term memory (LSTM)-based Koopman model is proposed to deal with this time-delayed control problem. By learning the time-delayed correlations hidden in the historical data, this model can predict the behavior of RFQ frequency detuning with given control actions. With this model, a model predictive control (MPC) strategy is developed to pursue better control performance.

Footnotes

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