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A machine learned model for quick access to analytic solutions of a QIS system[1] SALVADOR SOSA GUITRON, AASMA ASLAM, TRUDY BOLIN, University of New Mexico, KEVIN BROWN, Brookhaven National Laboratory, CLIO GONZALEZ-ZACARIAS, University of Southern California, BOHONG HUANG, Brookhaven National Laboratory, SALVADOR SOSA, University of New Mexico — For quantum information ion systems, the calculation of analytic solutions describing a state of interest can become computationally expensive even for systems with a relatively small number of ions. This can become a big constriction when attempting to quickly access specific states of a quantum ion system for manipulation. Here we describe the implementation of a Machine Learning algorithm to determine the equilibrium positions of a linear chain of ions, an ideal configuration of ions in a Paul trap or a storage ring with a crystalline beam. Specifically, given the solutions of this system for a relatively small amount of ions, our ML predicts the partial equilibrium solution of the system with a higher number of ions where the numerical approach takes longer calculating time with increasing number of ions.

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