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Machine Learning Based Response Matrix Correction

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The response matrix is the closed orbit distortion at each BPM responses to the change in every corrector. For a large ring, the response matrix has tens of thousands of data points which can fully include the linear optics of the ring. LOCO use response matrix for lattice calibration and error correction. For 4 th generation diffraction limitation ring which uses many strong sextupoles and octupoles, the response matrix will influence by the nonlinearity and can only be driven from closed orbit distortion tracking not from linear matrix. The strong nonlinearity will make it difficult for LOCO to match lattice parameters and also need more time to get jacobi matrix. Machine learning may help bypass the time assuming jacobi matrix and avoid local optima. This work try to improve the speed and accuracy of LOCO by machine learning method.

Primary Keyword

Secondary Keyword

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