

Early Indicators of Long Term Stability in Hadron

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indicators of long term stability based the short-term tracking data are considered in hadron colliders, like the CERN-LHC. Two early indicators are analysed: the Lyapunov coefficient and the variation of the instantaneous non-linear tunes. A threshold is associated to each indicator, by which a simple and automated procedure can be defined to select chaotic from regular trajectories. The methods are checked against long-term tracking (106 turns) for a linear lattice with a sextupole (Hénon map) and for the SPS lattice used in non-linear diffusion experiments. The results show that rather precise long-term dynamic aperture estimates can be worked out using short-term tracking data. The method is successfully applied to identify the dynamic aperture of the CERN-LHC in realistic situations.