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Surfaces for the optimization of the nonlinear electron dynamics in a synchrotron light source Accelerator design

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Surfaces for the optimization of the nonlinear electron dynamics in a synchrotron light source Accelerator design The coherence and brightness of light in synchrotron sources have significantly increased in the 4th generation. This has required very demanding storage rings, making control of electron dynamics very challenging. In this contribution, a formalism to optimize the nonlinear dynamics of electrons in a storage ring is presented. The formalism uses surfaces associated with a quasi-invariant polynomial, to first order in the percentage of momentum deviation, for optimizing the on- and off-momentum nonlinear electron dynamics. Different objective functions are explored, showing some of their strengths and weaknesses. A wide stable area in horizontal phase space is obtained, for the momentum deviation range of -3% to 3%, for a ring with an emittance of 84 pm rad. The extension of these studies for choosing the operating point of the storage ring is ongoing.

Resumen de la contribución

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