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Chromatic index to find a working point for a 4th generation synchrotron light source

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The design and tuning of a storage ring for a fourth-generation synchrotron light source is very demanding. Recently, some research groups have considered techniques based on quasi-invariants of motion to address this task. This contribution presents tools, based on a quasi-invariant of motion method, for the description and optimisation of the quality of electron dynamics in a storage ring. An overview of this quasi-invariant formalism in the context of electron dynamics in storage rings for synchrotron light sources is presented. Quasi-invariant surface techniques to study and optimise the quality of the dynamics of a particular model are shown in detail. The relevance of the chromatic index for the study and tuning of the cell to determine the working point of a machine is highlighted. These techniques are implemented to optimise the horizontal electron dynamics generated by a ring model based on a 7BA cell, with 20 cells, 81 pm rad emittance and approximately 490 m circumference, and the results are presented.

Footnotes

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