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Analytic derivative of orbit response matrix and dispersion with thick error sources and thick steerers implemented in python

Monday 8 May 2023 16:30 (2 hours)

While large circular colliders rely upon analysis of turn-by-turn beam trajectory data to infer and correct magnetic lattice imperfection and beam optics parameters, historically storage-ring based light sources have been exploiting orbit distortion, via the orbit response matrix. However, even large collider usually benefit of the orbit analysis during the design phase, in order to evaluate and define tolerances, correction layouts and expected performances. The proposed FCC-ee is no different, though its length (about 100 km) and amount of magnets (about ???) make the standard closed-orbit analysis time consuming. We applied new analytic tools to cope with this issue, showing a significant gain in computational time with practically no loss of accuracy. Examples of applications to the ESRF EBS storage ring and to the CERN FCC-ee are reported with an outlook to an additional challenge provided by the FCC-ee.

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Footnotes

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Yes

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