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# Introduction to Non- Linear longitudinal Beam Dymanics

*Tuesday 1 October 2024 09:35 (1 hour)*

After discussing how to account for the periodicity in rings, we first generalise the response coefficient R12, and then the orbit response matrix to such systems.

We move on to use the response matrix to correct the orbit and generalise the concept by introducing dispersion-free steering before turning to gradient errors and stop bands. Measuring and correcting the tune addresses one parameter of great importance for operating rings, whereas analysing the orbit response matrix with codes like LOCO measures many more, including the beta functions. We then digress on skew quadrupolar errors and betatron coupling and their detrimental effect.

Before closing we describe how to correct the chromaticity and mention a number of non-standard imperfections, so-called bloopers.

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