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* Identification of longitudinal impedance in a section of SPS using SSC method

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The LHC Injectors Upgrade (LIU) project plans doubling the bunch intensity in the LHC injector chain in order to meet the requirements of the High Luminosity LHC (HL-LHC) project. The longitudinal beam impedance of the Super Proton Synchrotron (SPS), part of the injector of the LHC, is currently one of the limitations in reaching higher beam intensities due to instability issues. In the context of LIU, components with high contribution to the impedance of SPS have to be identified and optimized. In this paper, the State Space Concatenation method (SSC), which is a numerical method for simulating a large structure by decomposing it into its components, is used to calculate the eigenmodes of a long straight section of the SPS ring. The modes with high contribution to the longitudinal impedance are then identified and methods to mitigate them are proposed.

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