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non linear beam response meets machine learning

For the 2D simulation of a beam position monitor (BPM) in a synchrotron light source there is a Matlab Code using the Boundary Element Method (BEM) developed in 2004 [1]. We are using this simulation at BESSY II for determining the induced charge on the buttons and studying non linear effects of the BPMs and their different geometries.
We decided to convert that code into Python to add new features.
By that we are able to apply a machine learning approach to extract beam position information at large displacements in the non linear regime. Eventually this can be deployed to the FPGA of the BPM electronics to supply real time data evaluation.

[1] A. Olmos, F. Perez, and G. Rehm, "Matlab Code for BPM Button Geometry Computation", in Proc. DIPAC'07, Venice, Italy, May 2007, paper TUPC19, pp. 186-188.

Primary author: SELBACH, Nicola (Helmholtz Zentrum Berlin)

Presenter: SELBACH, Nicola (Helmholtz Zentrum Berlin)

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