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Optimization and Fine Tuning of Machine Parameters with Model-Less Algorithm

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Despite the use in machine physics of high-performance software for calculating and predicting machine parameters, when these are applied to the real world, optimal operating point search is often necessary to obtain the desired performance.
Furthermore, small configuration changes required by FEL Users during running experiments ,lead to search new good working points in a short time.
Use of tools based on model-less algorithms such as Nelder-Mead and 1D or 2D scans allow the automatic and online search for the best fine setup of the parameters in short times.
The development of MIMOFB (Multi Input Multi Output Feedback) software used as optimizer with model-less algorithms has provided a versatile tool that can be applied in many situations.
The ability to concatenate optimizations with pre-programmed batch executions allows to develop complex optimization strategies and iterate them by refining algorithm's parameters.
In FERMI MIMOs optimizers are currently used with good results for fine tuning the electron beam magnetic optic and trajectory by acting on quadrupoles and correctors magnets current for FEL signal optimization and terahertz parasitic signal maximization to TeraFERMI line.

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