

Automated tuning using RL trained on Cheetah simulation at DESY and building Cheetah simulation for ISIS virtual accelerator

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Automating tuning has been an area of great interest in the accelerator community in recent years. Bayesian Optimisation (BO) has been favoured over Reinforcement Learning (RL) due to its short training time and reliability. However, RL has become increasingly viable with access to large training datasets from fast and differentiable simulation, Cheetah.

In this work, we develop Cheetah simulations and tune the R-Weg section of the DESY II synchrotron using RL. RL-based tuning is significantly faster than BO during inference, and initial results indicate that it is equally competitive in accuracy metrics. We also evaluate Cheetah for the ISIS Linac and explore its integration as a backend within our Virtual Accelerator for ISIS project.

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