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LLRF Iterative Learning Controller for TRIUMF ARIEL Superconducting cavities

The TRIUMF ARIEL superconducting cavities must be able to operate with cw beam or pulsed beam. To achieve the necessary degree of field regulation under heavy beam loading conditions, adaptive feed-forward control such as Iterative Learning Controller must be used. The stability regime for beam loading is quite different from most ILC investigated in literature, where only the disturbance is often the setpoint changes. Theoretical formulations and Numerical simulations have shown that using a non-causal moving average filter of only a few time samples can provide rapid convergence and stability.

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