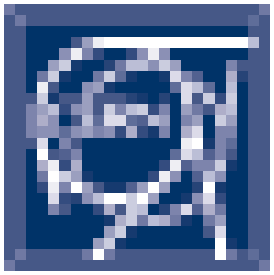

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# DECOUPLING PI CONTROLLER DESIGN FOR A NORMAL CONDUCTING RF CAVITY USING A RECURSIVE LEVENBERG-MARQUARDT ALGORITHM

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This paper addresses the system identification and the decoupling PI controller design for a normal conducting RF cavity. Based on the open loop measurement data of an SNS DTL cavity, the open loop system's bandwidths and loop time delays are estimated by using batched least square. With the identified system, a PI controller is designed in such a way that it suppresses the time varying klystron droop and decouples the In-phase and Quadrature of the cavity field. The Levenberg-Marquardt algorithm is applied for nonlinear least squares to obtain the optimal PI controller parameters.

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