Nonlinear System Identification of Superconducting Magnets of RHIC at BNL

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MOM310 (Systems Engineering & Project Management)

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Superconducting Magnet

1. Voltage Tap Circuit

2. Manually Calibrated Inductance Table

\[ V_c = L \frac{dl}{dt} \]

3. Spectrograms and Filtering of signals

4. MOM310, Nonlinear system identification of SC magnets of RHIC at BNL
System Identification

1. Current Segmentation
   - 1st der. ≠ 0, llnd der. ≠ 0
   - 1st der. ≠ 0, llnd der. = 0

2. L vs. I from Piecewise Regression

3. Residual Analysis
   - Histogram of Residuals
   - QQ Plot of Sample Data versus Standard Normal
   - Residuals versus Predicted Voltage
Field Test

MOM310, Nonlinear system identification of SC magnets of RHIC at BNL