

Identification of Power System Dynamic Model Parameters Using the Fisher Information Matrix

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The expected decrease in system inertia and frequency stability motivates the development and maintenance of dynamic system models by Transmission System Operators. However, some dynamic model parameters can be unavailable due to market unbundling, or inaccurate due to aging infrastructure, non-documented tuning of controllers, or other factors. In this paper, we propose the use of a numerical estimation of the Fisher Information Matrix (nFIM) for efficient inference of dynamic model parameters. Thanks to the proposed numerical implementation, the method is scalable to Electromagnetic Transient (EMT) models, which can quickly become computationally complex even for small study systems. Case studies show that the nFIM is coherent with parameter variances of single- and multi-parameter least-squares estimators when applied to an IEEE 9-bus dynamic model with artificial measurements, and is effective when used to estimate controller parameters in a real power island using field test measurements.