Computing the sampling time for induction machine parameter estimation using complex exponential series estimation

Tin Benšić,

Faculty of electrical engineering, computer science and information technology Osijek,

J.J. Strossmayer University Osijek

Induction motor is modeled by nonlinear state space model for which an offline and online parameter estimation techniques need to be developed. The offline techniques permit design of experiments and are generally well researched. However, most techniques choose how fast the sampled points of data are measured by experience. Through application of regression estimation of complex exponential series, the method for selecting the sampling interval is derived. The initial data set is manipulated through optimization procedure to accurately approximate the data obtained from a nonlinear system response with the complex exponential series. The estimated parameters of the series, namely the discrete system poles, are then used to compute the sampling time for the application of parameter estimation procedures for the nonlinear induction machine model. It is shown that the amount of data for offline parameter estimation of induction motor model can be significantly reduced. The data reduction permits the use of parameter estimators based on metaheuristic optimizers with realistic execution times.