Predictive Power Control for DFIG: A FARE-Based Weighting Matrices Approach

Lucas L. Rodrigues, Omar A. C. Vilcanqui, Andre L. L. F. Murari, Alfeu J. Sguarezi Filho

Abstract— Model predictive control (MPC) is a very popular technique for doubly fed induction generator (DFIG), and several MPC topologies have been proposed. However, most of the time, the controller parameters are done in a heuristic way. This paper proposes an analytical method for the design weighting matrices based on the fake algebraic Riccati equation (FARE). The proposed methodology guarantees the control system stability. Furthermore, simulations results were used to choose the desired control horizon and the desired prediction horizon, considering the steady-state error and the computational cost. Moreover, the DFIG vector control model, the MPC theory, and the FARE formulation were presented. Experimental results were shown to endorse the proposed method.

For the published version of record document, go to:
http://dx.doi.org/10.1109/JESTPE.2019.2898924