

This paper focuses on the constraint handling for induction machines (IMs) using model predictive control (MPC) to enhance the optimality. Commonly, the constraints of IMs are represented by stator current and voltage limits, which are described as quadratic inequality in dq-frame. Due to the spherical feature, the constraints have to be replaced by approximation by polygon in order to get a standard form of quadratic programming (QP). In this paper, a novel approach is proposed to convert the quadratic inequalities into linear ones without approximation, whereat the inequality is parameter-varying. To tackle this parameter-varying inequality, the multiparametric quadratic program (mp-QP) algorithm for reference tracking is utilized and extended. To ensure the optimization problem solved in real time, an explicit MPC (EMPC) via mp-QP is applied instead of any online numerical solver.