1126-49-26 **Harbir Antil*** (hantil@gmu.edu), Department of Mathematical Sciences, 4400 University Drive, MS: 3F2, Exploratory Hall, room 4201, Fairfax, VA 22030, **Michael Hintermueller**, Weierstrass Institute, Prof. Dr. Michael Hintermueller, Mohrenstrasse 39, 10117 Berlin, Germany, **Ricardo H. Nochetto**, Department of Mathematics, University of Maryland, College Park, MD 20742, **Thomas M. Surowiec**, University of Marburg, Department of Mathematics, MZG Raum 06D26, Marburg, Germany, and **Donat Wegner**, Humboldt University, Department of Mathematics, Berlin, Germany. *Finite Horizon Model Predictive Control of Electrowetting on Dielectric with Pinning.*

A time-discrete spatially-continuous electrowetting on dielectric (EWOD) model with contact line pinning is considered as the state system in an optimal control framework. The pinning model is based on a complementarity condition. In addition to the physical variables describing velocity, pressure, and voltage, the solid-liquid-air interface, i.e., the contact line, arises as a geometric variable that evolves in time. Due to the complementarity condition, the resulting optimal control of a free boundary problem is thus a mathematical program with equilibrium constraints (MPEC) in function space. In order to cope with the geometric variable, a finite horizon model predictive control approach is proposed. Dual stationarity conditions are derived by applying a regularization procedure, exploiting techniques from PDE-constrained optimization, and then passing to the limit in the regularization parameters. Moreover, a function-space-based numerical procedure is developed by following the theoretical limit argument used in the derivation of the dual stationarity conditions. The performance of the algorithm is demonstrated by several examples; including barycenter matching and trajectory tracking. (Received December 05, 2016)