1125-49-2349   **Evan Cosgrove*** (`ecosgrove2011@my.fit.edu`), 1081 Hoyt Ct. NE, Palm Bay, FL 32907, **Ugur G. Abdulla** (`abdulla@fit.edu`), 150 W University Blvd, Melbourne, FL 32901, and **Jonathan Goldfarb** (`jgoldfar@my.fit.edu`), 150 W University Blvd, Melbourne, FL 32901. *Optimal Control of the Coefficients in Second Order Parabolic Free Boundary Problems.*

Inverse Stefan type free boundary problem for the second order parabolic PDEs with unknown coefficient is considered. Optimal control framework is employed where coefficient of the PDE and free boundary are components of the control vector. We prove the Frechet differentiability in Besov spaces and derive the formula for the Frechet gradient under the minimal regularity assumptions on the data. Necessary condition for the optimality is formulated and projective gradient method in Besov-Hilbert spaces framework is implemented. Numerical results of model examples are presented. (Received September 20, 2016)