Seminar of the Chair of Optimization and Control

under prof. Stanisław Migórski

summer semester 2019-2020, Thursday, 10:15-11:45, room 1177

February 27, March 5, 2020
Michał Jureczka, Numerical Analysis of Elliptic Hemivariational Inequalities for Semipermeable Media

The talk was based on the paper:
Weimin Han, Ziping Huang, Cheng Wang, Wei Xu, Numerical Analysis of Elliptic Hemivariational Inequalities for Semipermeable Media, Journal of Computational Mathematics, Vol.37, No.4, 2019, 543–560, doi:10.4208/jcm.1807-m2018-0035

ABSTRACT: In this paper, we consider elliptic hemivariational inequalities arising in applications in semipermeable media. In its general form, the model includes both interior and boundary semipermeability terms. Detailed study is given on the hemivariational inequality in the case of isotropic and homogeneous semipermeable media. Solution existence and uniqueness of the problem are explored. Convergence of the Galerkin method is shown under the basic solution regularity available from the existence result. An optimal order error estimate is derived for the linear finite element solution under suitable solution regularity assumptions. The results can be readily extended to the study of more general hemivariational inequalities for non-isotropic and heterogeneous semipermeable media with interior semipermeability and/or boundary semipermeability. Numerical examples are presented to show the performance of the finite element approximations; in particular, the theoretically predicted optimal first order convergence in H1 norm of the linear element solutions is clearly observed.