The series of three talks aims at explanation of some functional a posteriori error estimates developed with S. Repin recently. Typical applications are problems of mechanics such as problems with boundary conditions including the elasticity with fricttion, elastoplasticity and poroelasticity. We will refer to the following publications:

Sergey Repin, Jan Valdman,
Functional a posteriori error estimates for problems with nonlinear boundary conditions.
Journal of Numerical Mathematics 16, No. 1, 51-81 (2008)

Jan Valdman,
Minimization of Functional Majorant in A Posteriori Error Analysis based on H(div) Multigrid-Preconditioned CG Method. Advances in Numerical Analysis, vol. 2009, Article ID 164519 (2009)

Sergey Repin, Jan Valdman,
Functional a posteriori error estimates for incremental models in elasto-plasticity.
Cent. Eur. J. Math. 7, No. 3, 506-519 (2009)

Jan Martin Nordbotten, Talal Rahman, Sergey Repin, Jan Valdman,
A posteriori error estimates for approximate solutions of Barenblatt-Biot poroelastic model.
Computational Methods in Applied Mathematics 10, No. 3, 302-315 (2010)

P. Neittaanmaki, S. I. Repin and J. Valdman,
Functional a posteriori error estimates for elasticity problems with nonlinear boundary conditions. (in preparation)