A posteriori error estimates of the discontinuous Galerkin method for linear elliptic and parabolic problems

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We deal with a posteriori error estimates of the discontinuous Galerkin (DG) methods applied to the Poisson and heat conduction equations. DG technique provides a high order discontinuous approximation. We present DG formulation of these problems and discuss a use of three types of a posteriori error analysis for the Poisson equation: estimates based on the Galerkin orthogonality, estimates based on the dual formulation and estimates based on the Helmholtz decomposition. The last one technique is further used for the a posteriori error analysis of the heat conduction equation.