On the Galerkin least-squares method for the Oldroyd-B model

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This talk concerns a reduced Galerkin least-squares finite element method for the Oldroyd-B model of viscoelastic fluid flows. By fixing the gradient of the velocity vector in the constitutive equations, an a priori error estimate is derived for the reduced Galerkin least-squares method. Model problems considered are the flow past a planar channel and a 4-to-1 contraction problems. Numerical results supporting the estimates are presented. Convergent solutions with respect to the mesh refinement will also be demonstrated for high Deborah numbers.