An exact linear and angular momentum conserving hybrid spectral element method

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In this talk we will present a hybrid, mixed spectral element formulation for a linear elasticity. The solution will satisfy conservation of linear and angular momentum strongly, in a point-wise sense.

The mixed formulation is based on the minimization of the complementary elastic energy subject to the constraints that the stress tensor satisfies equilibrium of forces (linear momentum conservation) and conservation of angular momentum. The Lagrange multipliers which enforce these constraints are the displacement field and the field of rotations, respectively.

The hybrid formulation does not suffer from spurious kinematic modes through a judicious choice of degrees of freedom/basis functions.