

# A PRIORI ERROR ESTIMATES FOR A COSEISMIC SLIP OPTIMAL CONTROL PROBLEM

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ABSTRACT. This article presents an a priori error estimation for a finite element discretization applied to an optimal control problem governed by a mixed formulation for linear elasticity equations, where weak symmetry is imposed for the stress tensor. The optimal control is given by a discontinuity jump in displacements, representing the coseismic slip along a fault plane. This slip corresponds to the moment of an earthquake occurs, rendering this optimal control problem scientifically significant. We establish an a priori error estimate using appropriate finite element spaces for both control and states. Our theoretical convergence rates were validated through numerical experiments.

**Keywords:** finite elements, elasticity equations, inverse problems, optimal control

**Mathematics Subject Classifications (2010):** 65N30, 65R32, 65Z05, 49J50, 74G75

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