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Survey of dynamic contact algorithms

Intern: Jonathan Hoy, University of Southern California, **Virtual at:** Los Angeles, CA
Mentor: Irina Tezaur, 08754 Department of Quantitative Modeling and Analysis

Abstract Contact is an important aspect of computational simulation of mechanical systems. State-of-the-art computational methods for simulating mechanical contact are fraught with numerical difficulties, leading to poor performance (in terms of CPU-time and accuracy) and a lack of robustness. Here, we evaluate a novel method for simulating contact based on the Schwarz alternating formulation, in which contact constraints are replaced with boundary conditions that are applied iteratively on the contact boundaries. Results on a canonical impact problem with an exact analytical solution suggest that the new Schwarz methodology is superior to established approaches including the penalty, Lagrange multiplier and augmented Lagrangian methods.

Problem Domain	**Technical Approach**	**Mission Application**
Solid Mechanics	Schwarz alternating method	Impact/fastener failure

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Survey of dynamic contact algorithms: preliminary results

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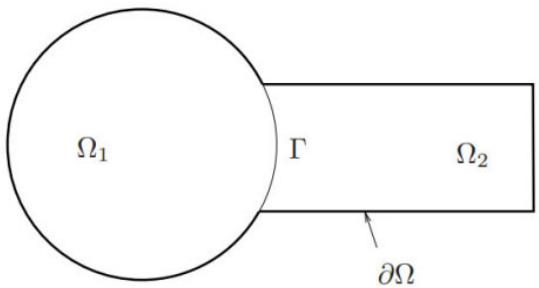
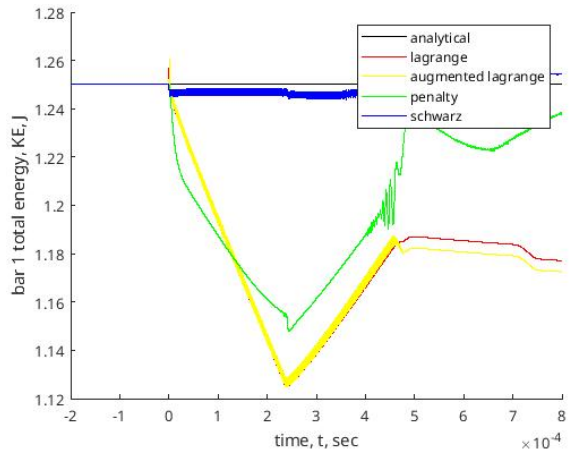
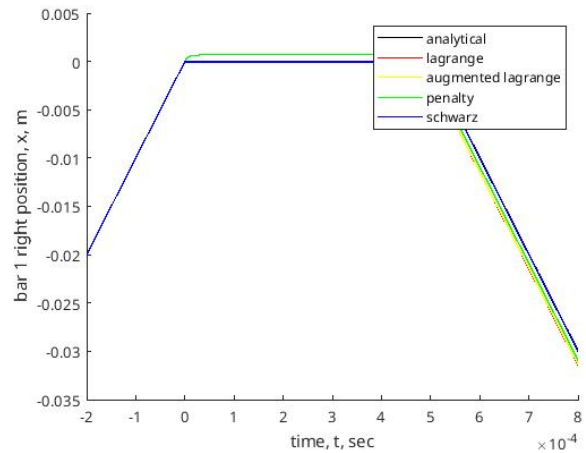
Using the Schwarz alternating problem, the problem is treated as a coupled system where the two domains in contact Ω_1 and Ω_2 are given alternating Dirichlet and Neumann boundary conditions during each iteration until a converged result is obtained







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