JOSEPH T. MAESTAS

Department of Applied Mathematics & Statistics
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EDUCATION

Doctor of Philosophy, Applied Mathematics and Statistics
Colorado School of Mines, Golden, CO GPA 3.52 Completed August 2015

Master of Science, Mechanical Engineering
Colorado School of Mines, Golden, CO GPA 3.52 May 2013

Bachelor of Science, Engineering (Mechanical Specialty)
Colorado School of Mines, Golden, CO GPA 3.93 May 2011

RESEARCH

My research is in the area of long-range shock propagation modeling with specific emphasis on propagation within ocean waveguides. Seafloors present unique challenges as they can consist of loose, unconsolidated sediments as well as hard rock; effects from low-shear speed and dissipative sediments can have a profound effect on the devolution of shock into acoustic waves. Models developed in this work range from fractional finite difference schemes to finite volume methods using high-order Godunov approaches. Numerical models are tailored to provide necessary accuracy while remaining efficient when applied to long ranges.

PROFESSIONAL EXPERIENCE

Applied Research Associates June 2010 - present (Internship)

- Performed shock physics calculations using CTH (SNL hydrocode) to model pressure waveforms within shock tubes. Results were used to design a shock tube that provided a required pressure signature.
- Designed and fabricated a shock tube for use in hearing protection research. Designed the shock testing procedure, ran experiments, and analyzed data associated with hearing protection tests.
- Performed long range, underwater shock calculations to verify results obtained with the Underwater Calculator, an empirical tool used to predict effects associated with the explosive removal of offshore structures.
- Supported the development and testing of a bioaerosol detection system. Design was adaptively modified until the greatest detection was achieved.
- Supported the development of a penetrating weapon fuzewell modification test effort. Assisted in the cook-off testing of the fuzewell and developed the safety procedures for the testing.
- Generated component-level finite element meshes for a portion of a triggering device and ran post-processing using LS-PrePost.
- Ran PENCURV+ calculations to characterize warhead failure in multilayer penetration events and compared results to experimental data.

ENGINEERING SKILLS

Programming Proficiency: Fortran, MATLAB, C/C++, BASIC
Numerical Tools: CTH, Solidworks (including FLOWorks and Solidworks Simulation), TruGrid, PENCURV+, ANSYS, Mathcad, LabVIEW, Minitab, Engineering Equation Solver
High Performance Computing: Message Passing Interface (MPI), Open Multiprocessing (OpenMP), some experience with GPU programming via Compute Unified Device Architecture (CUDA)

PUBLICATIONS

- J. T. Maestas, L. Taylor, and J. M. Collis, "Shock wave propagation along constant sloped ocean bottoms," J. Acoust. Soc. Am. **136**, 2987–2997 (2014).
- J. T. Maestas and J. M. Collis, "Nonlinear acoustic pulse propagation in dispersive sediments using fractional loss operators,". Submitted to J. Acoust. Soc. Am. November 2014.

PRESENTATIONS

- "Nonlinear Acoustic Pulse Propagation in a Range-dependent Underwater Environment," Conference on Earth and Energy Research, Golden, CO. March 2012
- "Nonlinear Acoustic Pulse Propagation in a Range-dependent Underwater Environment," 164th Meeting of the Acoustical Society of America, Kansas City, MO. October 2012.
- "Nonlinear acoustic pulse propagation in dispersive sediments using fractional loss operators," 166th Meeting of the Acoustical Society of America, San Francisco, CA. December 2013.

MEMBERSHIPS

- Acoustical Society of America: student member since 2012
- Society of Hispanic Professional Engineers: served as the CSM Chapter treasurer during the 2011-2012 academic year

HONORS

Graduated Summa Cum Laude, Colorado School of Mines 2007
Awarded the CO-AMP Bridge to the Doctorate Fellowship, 2011
Awarded the Bechtel Educational Excellence Initiative Fellowship, 2013

RESEARCH INTERESTS

Nonlinear waves, shock propagation, elastic wave propagation and modeling, high performance computing, underwater acoustics, numerical modeling methods including finite volume methods, boundary element methods, finite element methods, and discrete element methods

References upon request.