Tsuyoshi Koyama

CONTACT INFORMATION

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PRESENT OCCUPATION

University of California, Berkeley, Berkeley, California

Lecturer January 2009 -

- CE 130N: Mechanics of Structures (Spring 2009)
  Undergraduate level course.

EDUCATION

University of California, Berkeley, Berkeley, California USA

Ph.D. Civil and Environmental Engineering May 2008

- Dissertation title: "Efficient Evaluation of Damping in Resonant MEMS"
- Advisor : Prof. Sanjay Govindjee
- Major : Computational Mechanics
- Minor : MEMS, Numerical Analysis

M.A. Math May 2008

- Emphasis on Analysis (Numerical Linear Algebra)

University of Tokyo, Tokyo, Japan

M.Eng. Architecture September 2003

- Thesis title: "Fundamental Analysis on the Effect of Foundation Beam Rigidity"
- Advisor : Prof. Hitoshi Kuwamura

B.Eng. Architecture March 2001

- Thesis title: "Limitations of Base Isolation "
- Advisor : Prof. Hitoshi Kuwamura

TEACHING

Advanced Mechanics of Materials (Fall 2008), University of California, Berkeley, Berkeley, California, USA

- Instructor for Undergraduate/Masters level course.
  3 hours of lecture per week.

Nonlinear Continuum Mechanics (Winter 2006), ETH Zurich, Zurich, Switzerland

- Teaching assistant for Masters level course.
  In charge of 1 hour of discussion per week. (Rated:4.8 /5.0, Dept.Ave.:3.9)
  Constructed weekly homework. (Rated:4.65/5.0, Dept.Ave.:3.7)

Elasticity in Architecture (Summer 2001), University of Tokyo, Tokyo, Japan

- Teaching assistant for undergraduate level course.

Plasticity in Architecture (Winter 2001), University of Tokyo, Tokyo, Japan

- Teaching assistant for undergraduate level course.

Awards

- One of two selected best presentations at BSAC (Berkeley Sensor and Actuator Center) Industrial Advisory Board meeting, March 2006.

Research

Visiting Graduate Student Researcher (August 2006 - July 2008), ETH Zurich, Switzerland,

Graduate Student Researcher (August 2003 - July 2006), University of California, Berkeley, USA

- Development of simulation tools for resonant MEMS.
  SUGAR (nodal analysis techniques)
  HiQLab (finite element techniques)
  `http://www.cims.nyu.edu/~dbindel/hiqlab/`

Research Interests

- Computational mechanics and finite element analysis
- Coupled physics problems
- Modeling microelectromechanical systems (MEMS)
- Numerical modeling of damping phenomenon
- Numerical linear algebra (solution of eigenvalue problems and linear systems)
- Large scale numerical simulations involving parallel computing
- Reduced-order modeling of large scale systems

Archival Publications

1. T. Koyama and S. Govindjee. Optimal parameter selection of the Perfectly Matched Layer for applications in time harmonic wave propagation (In preparation).
2. T. Koyama and S. Govindjee. Moment Matching Theorems for Dimension Reduction of Higher-Order Dynamical Systems via Higher-Order Krylov Subspaces (Submitted to SIAM Journal of Matrix Analysis and Applications).
3. T. Koyama, H. Kuwamura. Structural Modeling and Elastic Behavior of Steel Moment Frames with Steel Foundation Beams, *Japan Journal of Structural Engineering* , Vol. 50B, 393-403, March 2004.

Refereed Conference Proceedings

1. T. Koyama, D.S. Bindel, W. He, E. Quévy, S. Govindjee, J.W. Demmel, and R.T. Howe. Simulation Tools for Damping in High Frequency Resonators. *Proceedings of IEEE SENSORS 2005*. Irvine CA, November 2005.
2. D.S. Bindel, E. Quévy, T. Koyama, S. Govindjee, J.W. Demmel, and R.T. Howe. Anchor Loss Simulation in Resonators. *Proceedings of MEMS 2005*. Miami, FL, February 2005.

Unrefereed Conference Proceedings

1. T. Koyama and S. Govindjee. Solving generalized complex-symmetric eigenvalue problems arising from resonant MEMS simulations with PETSc. *Proceedings of the 6th International Congress on Industrial and Applied Mathematics 2007*. Zurich, Switzerland, July 2007.
2. T. Koyama, J. Iyama, H. Kuwamura. Study on the Application of Steel Foundation Beams - Part 5. Structural Modeling of Single-Pile Foundation with Rigid Connections at Pile Head. *Summaries of Technical Papers of Annual Meeting Architectural Institute of Japan*, C-1, pp.911-912 , Kanazawa, Japan, August 2002.

Other

1. T. Koyama and S. Govindjee. Moment Matching Theorems for Dimension Reduction of Higher-Order Dynamical Systems via Higher-Order Krylov Subspaces. Technical Report SEMM-2008-04, Structural Engineering, Mechanics and Materials, Department of Civil and Environmental Engineering, University of California, Berkeley, November 2008.
2. T. Koyama. Efficient Evaluation of Damping in Resonant MEMS. Ph.D. dissertation, University of California, Berkeley, Berkeley, 2008.

Minisymposia and Invited Presentations

1. "Structure Preserving Reduced-Order Models for Second-Order Linear Dynamical Systems." Workshop on Geometric Mechanics and Applied Dynamics, Oberwolfach, Germany, July 2008.
2. "Computing Interior Eigenvalues of a Generalized Complex-Symmetric Pencil arising from the Modeling of Resonant MEMS Systems." 8th World Congress on Computational Mechanics(WCCM8) and 5th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2008), Venice, Italy, June 2008.
3. "Modeling of Thermoelastic Damping in MEMS Resonators." 8th United States National Congress on Computational Mechanics, Austin, Texas, August 2005.

Other Presentations

1. "Computing Interior Eigenvalues of a Generalized Complex-Symmetric Pencil arising from the Modeling of Resonant MEMS Systems." Leibniz Universitaet Hannover, Germany, July 2008.
2. "Computing Interior Eigenvalues of a Generalized Complex-Symmetric Pencil arising from the Modeling of Resonant MEMS Systems." University of Erlangen-Nuremberg, Germany, July 2008.
3. "HiQLab: Simulation of Resonant MEMS." Beowulf Day at ETH Zurich, January 2007.
4. "MEMS Resonator Simulation." BSAC Industrial Advisory Board meeting, March 2006.

Language proficiency

English (native), Japanese (native), German (basic conversation)

Academic References

- Sanjay Govindjee
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- Robert L. Taylor
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- David S. Bindel
  Courant Instructor, Courant Institute of Mathematical Sciences, New York University
  Department of Mathematics,
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