MECHANICS RESEARCH COMMUNICATIONS

Elsevier Distinguished Lecture

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Prof. Thomas J. R. Hughes
Institute for Computational Engineering and Sciences
University of Texas at Austin

April 11, 2012
2:30 a.m. – 4:00 p.m.
Guttenberg Information Technologies Center (GITC) – Room 1400

Webcast URL: **http://live.njvid.net/njit**

Isogeometric Analysis

Computational geometry has until very recently had little impact upon the numerical solution of partial differential equations. The purpose of this talk is to explore Isogeometric Analysis, in which NURBS (Non-Uniform Rational B-Splines) and T-Splines are employed to construct exact geometric models [1,2] of complex domains. I will review recent progress toward developing integrated Computer Aided Design (CAD)/Finite Element Analysis (FEA) procedures that do not involve traditional mesh generation and geometry clean-up steps, that is, the CAD file is directly utilized as the analysis input file. I will summarize some of the mathematical developments within Isogeometric Analysis that confirm the superior accuracy and robustness of spline-based approximations compared with traditional FEA. I will present sample applications to problems of solids, structures and fluids

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Thomas J.R. Hughes holds B.E. and M.E. degrees in Mechanical Engineering from Pratt Institute and an M.S. in Mathematics and Ph.D. in Engineering Science from the University of California at Berkeley. He taught at Berkeley, Caltech and Stanford before joining the University of Texas at Austin. At Stanford he served as Chair of the Division of Applied Mechanics, Chair of the Department of Mechanical Engineering, Chair of the Division of Mechanics and Computation, and occupied the Crary Chair of Engineering. At Austin he is Professor of Aerospace Engineering and Engineering Mechanics and holds the Computational and Applied Mathematics Chair III. He is a Fellow of the AAM, ASME, AIAA, ASCE, AAAS, a Founder, Fellow and past President of USACM and IACM, past Chair of the Applied Mechanics Division of ASME, past Chair of the US National Committee on Theoretical and Applied Mechanics, and co-editor of the international journal *Computer Methods in Applied Mechanics and Engineering*.

Dr. Hughes is one of the most widely cited authors in Computational Mechanics. He has received the Huber Prize and Von Karman Medal from ASCE, the Melville, Worcester Reed Warner, and Timoshenko Medals from ASME, the Von Neumann Medal from USACM, the Gauss-Newton Medal from IACM, the Computational Mechanics Award of the Japan Society of Mechanical Engineers, the Grand Prize from the Japanese Society of Computational Engineering and Sciences, and the Humboldt Research Award for Senior Scientists from the Alexander von Humboldt Foundation. He is a member of the US National Academy of Sciences, the US National Academy of Engineering, the American Academy of Arts and Sciences, the Academy of Medicine, Engineering and Science of Texas, and a Foreign Member of the Royal Society, the Austrian Academy of Sciences, and the Istituto Lombardo Accademia di Scienze e Lettere. Dr. Hughes holds honorary doctorates from the universities of Louvain, Pavia, Padua, Trondheim, and Northwestern.

For further information, please contact Dr. A. Rosato, MIE Department (rosato@njit.edu; 973-596-5829), or Ms. Barbara Valenti (Valenti@njit.edu; 973-596-3332)