

ME/IME SEMINAR SERIES • FALL 2006

Product Platform and Product Family Design Optimization: Challenges and Opportunities

by **Timothy W. Simpson**

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Abstract

The proliferation of niche markets is forcing many companies to increase the breadth and depth of their product lines. Meanwhile, product development cycles are increasingly being shortened by market pressures, and cost management and reduction throughout the product lifecycle remains imperative for sustained success and growth. Many companies are successfully responding to these pressures using platform-based product development – a strategic and cost-effective approach to generate a family of products derived from a shared and common platform. Product family design embodies all of the challenges present in product design while adding the complexity of coordinating the development of multiple products in an effort to maximize commonality across the set of products without compromising their individual performance. In this talk, design optimization approaches for resolving the inherent tradeoff between platform commonality and individual product performance within the family are discussed and classified. Several formulations of the product family optimization problem are presented and compared in terms of their efficiency and effectiveness in obtaining useful solutions. The design of a family of ten electric motors based on a single product platform is used to demonstrate the problem formulations and highlight the difficulties and challenges facing designers in this active field of research. Promising areas for future work are also discussed.

Speaker's Brief Biography

Dr. Simpson joined the Penn State faculty in Fall 1998 and is a Professor of Mechanical and Industrial Engineering and Engineering Design. He received his Ph.D. and M.S. degrees in Mechanical Engineering from Georgia Tech in 1998 and 1995, and his B.S. in Mechanical Engineering from Cornell University in 1994. He teaches courses on Product Family Design, Concurrent Engineering, and Product Dissection. His research interests include product family and product platform design and optimization, web-based platform customization, and multidisciplinary design optimization, and he is the lead editor on the book, Product Platform and Product Family Design: Methods and Applications. He is a recipient of the NSF Career Award and the 2005 SAE Ralph R. Teeter Educational Award. He has also received the 2005 Premier Teaching Award and the 2004 Outstanding Research Award from the Penn State Engineering Society, the 2001-2002 Outstanding Faculty Member Award from the IIE Student Chapter, and the 1999 Outstanding Faculty Award in Mechanical & Nuclear Engineering. He is Director of the Product Realization Minor at Penn State and is active in ASME, AIAA, and ASEE. He is the incoming Chair of the AIAA Multidisciplinary Design Optimization Technical Committee, an elected member of the ASME Design Automation Executive Committee, and the Chair for the 33rd ASME Design Automation Conference.

Friday, October 20, 2006

2:30 – 4:00 PM

2:30-3 is social time in Rogers Hall 226;

Seminar begins promptly at 3 PM in Rogers Hall 230

Coffee and tea will be served



**Departments of Mechanical Engineering and
Industrial & Manufacturing Engineering**