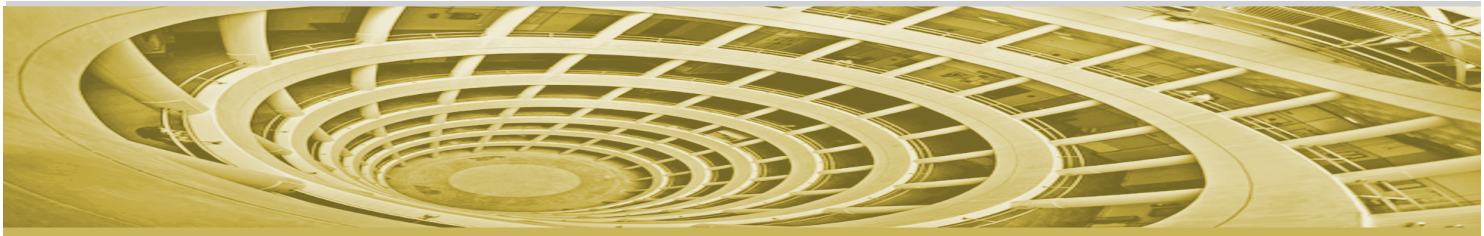
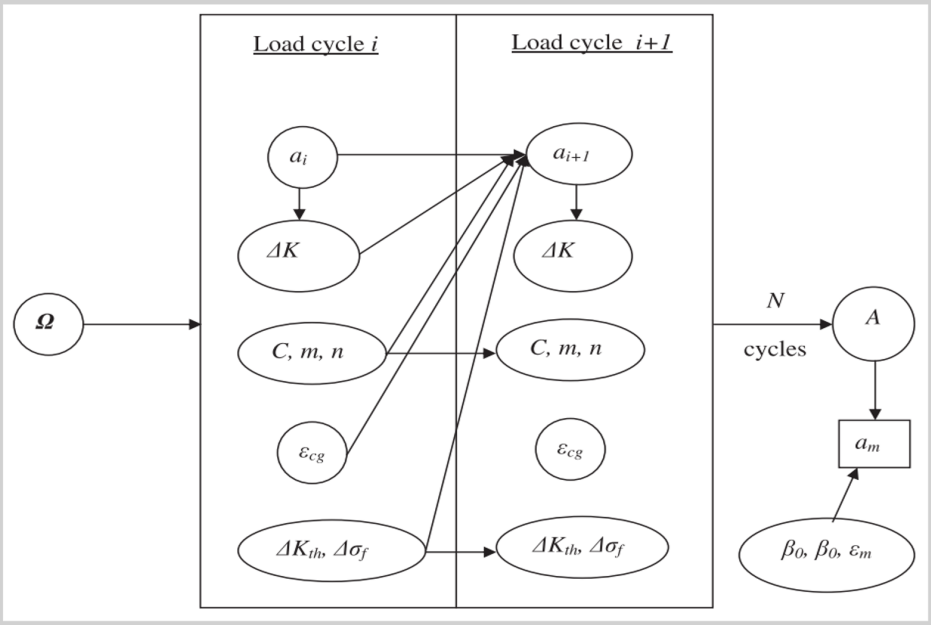


PROGRAMA DE DOCTORADO EN INGENIERÍA CIVIL

MÁSTER DE ESTRUCTURAS

ciencia e ingeniería de estructuras

Uncertainty in Engineering: An Overview



Dr. Shankar SANKARARAMAN

Intelligent Systems Division NASA Ames Research Center
CALIFORNIA

Día : Lunes 17 de noviembre 2014
Hora : 11:30h
Lugar : Seminario I, 4ª planta de la , E.T.S. Ing. Caminos, C. y P.
Campus Fuentenueva

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PROGRAMA DE DOCTORADO EN INGENIERÍA CIVIL

MÁSTER DE ESTRUCTURAS

Uncertainty in Engineering: An Overview

This talk discusses the impact of uncertainty in different types of engineering applications and presents an overview of the state-of-the-art computational methods for uncertainty quantification and management, with an emphasis on structural engineering applications. To begin with, a comprehensive framework for the treatment of uncertainty is essential to facilitate decision-making in engineering systems at every stage of the life cycle, such as design, manufacturing/construction, operations,

system health monitoring, and risk management. It is not only important to identify and quantify the different sources of uncertainty that may arise due to natural variability, data uncertainty, and model uncertainty, but also necessary to quantify their combined effect on the system-level prediction. A Bayesian methodology will be presented for uncertainty quantification and integration in complex systems where the overall system can be decomposed into multiple subsystems and components that interact with one another. This methodology is based on the concept of Bayesian networks that serve as an efficient tool for integrating uncertain quantities (that are a part of the engineering application) along with corresponding component-level, subsystem-level, and system-level models and experimental data using the concepts of conditional probability and total probability. Bayesian networks are useful
for different types of such as system-level performance prediction, design, optimal resource allocation,
etc. Finally, this talk will also discuss on the impact of uncertainty on system health monitoring (during

Shankar SANKARARAMAN

Shankar Sankararaman received his Bachelors' degree in Civil Engineering from the Indian Institute of Technology, Madras in India in 2007 and later, obtained his Ph.D. in Civil Engineering from Vanderbilt University, Nashville, Tennessee, U.S.A. in 2012. His research focuses on the various aspects of uncertainty quantification, integration, and management in different types of aerospace, mechanical, and civil engineering systems. His research interests include probabilistic methods, risk and reliability analysis, Bayesian networks, system health monitoring, diagnosis and prognosis, decision-making under uncertainty, treatment of epistemic uncertainty and multidisciplinary analysis. He is a member of the Non-Deterministic Approaches (NDA) technical committee at the American Institute of Aeronautics, the Probabilistic Methods Technical Committee (PMC) at the American Society of Civil Engineers (ASCE), and the Prognostics and Health Management (PHM) Society. Currently, Shankar is a researcher at NASA Ames Research Center, Moffett Field, CA, where he develops algorithms for uncertainty assessment and management in the context of system health monitoring, prognostics, and decision-making.

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