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FINAL TECHNICAL REPORT

on

**A WORKSHOP ON NEW DIRECTIONS IN
EXTREMAL STOCHASTIC ANALYSIS OF
NONLINEAR OCEAN SYSTEMS**

RESEARCH PROJECT N00014-93-10480

in support of

**RELIABILITY OF NONLINEAR OCEAN STRUCTURES
UNDER STOCHASTIC EXCITATION**

Submitted to

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Mathematical Sciences Division
Office of Naval Research**

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TITLE: A Workshop on New Directions in Extremal Stochastic Analysis of Nonlinear Ocean systems

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Technical Objective: The objective of the workshop was to facilitate the advancement of the state of knowledge for the evaluation of the response of nonlinear ocean systems to stochastic excitation, with emphasis on response characteristics of significance for reliability analysis. The workshop would provide a forum for: (1) ONR supported researchers under the new program on "Reliability of Nonlinear Ocean Structures Under Stochastic Excitation" (the reliability program) and experienced Navy personnel to hold discussions and exchange ideas on Naval needs to date and new research directions; and (2) the coordination of research efforts among physics, mathematical sciences, and engineering researchers under the program to achieve cross-field synergistic effects.

Approach: The approach was to hold a workshop at the initiation of the reliability program. All ONR PIs directly supported under the program, other ONR supported PIs on related research topics, and personnel from various Naval centers including ONR, David Taylor Model Basin, Naval Surface Warfare Center, Naval Sea Systems Command, and Naval Civil Engineering Laboratory were invited to participate.

Accomplishment: A very successful workshop was held on 7-8 July 1993. PIs in mathematics, physical sciences, and engineering directly supported under the program gave tutorial presentations in their specialty and discussed their specific approaches and plans for the first year of their research. ONR and other Navy personnel presented state-of-the-art, practical procedures for analysis and design of naval systems and immediate research needs for their reliability analysis. A general discussion session was held immediately after the presentations. Focus of the discussion was on naval systems modeled as stochastic differential equations with excitations that were non-Gaussian processes describing wind, wave, and current effects. The two-day workshop achieved its goals of facilitating technical knowledge exchange and the fine-tuning of the research focuses of the individual PIs in the program. A proposal for a second workshop was submitted (and subsequently accepted) to continue the exchange of ideas and update research progress among all the participants.

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