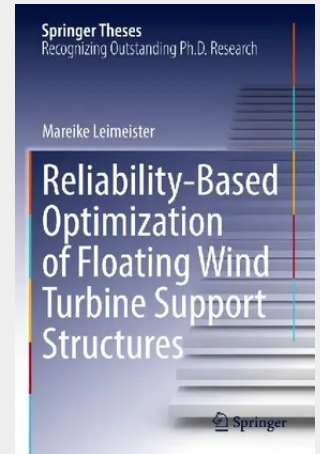


Reliability-Based Optimization of Floating Wind Turbine Support Structures

This book pursues the ambitious goal of combining floating wind turbine design optimization and reliability assessment, which has in fact not been done before. The topic is organized into a series of very ambitious objectives, which start with an initial state-of-the-art review, followed by the development of high-fidelity frameworks for a disruptive way to design next generation floating offshore wind turbine (FOWT) support structures. The development of a verified aero-hydro-servo-elastic coupled numerical model of dynamics for FOWTs and a holistic framework for automated simulation and optimization of FOWT systems, which is later used for the coupling of design optimization with reliability assessment of FOWT systems in a computationally and time-efficient manner, has been an aim of many groups internationally towards implementing a performance-based/goal-setting approach in the design of complex engineering systems. The outcomes of this work quantify the benefits of an optimal design with a lower mass while fulfilling design constraints. Illustrating that comprehensive design methods can be combined with reliability analysis and optimization algorithms towards an integrated reliability-based design optimization (RBDO) can benefit not only the offshore wind energy industry but also other applications such as, among others, civil infrastructure, aerospace, and automotive engineering.

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