



Model Reduction for Design Optimization of Naval Systems

Design optimization remains computationally challenging, even with petascale or exascale computing capabilities. Typically the solution of the constraint equation involves a very large algebraic system. The minimization algorithm requires a large number of functions and gradient evaluations that are also computationally intensive. So reduced-order representations are of great interest and potential to decrease these computational burdens. The reduction in dimension can be dramatic while preserving a good approximation of the field variables. Methods for computing efficiently reduced-order bases are the subject of many works. However, reduced-order models for design optimization problem have not received the same attention.

The objective is to develop a rigorous mathematical and computational framework for design optimization of naval systems with reduced-order models. The challenges include the definition of reduced-order bases of optimal dimension and the study of error estimates and range of validity for these reduced-order models.

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Profile: Interested candidates should possess a master's degree in (Applied) Mathematics, Scientific Computing, Physics, or Engineering. The ideal candidate should have a strong background in numerical analysis or optimization, and programming languages (C, C++).

The internship would start in March - April 2012, for a period of 5 to 6 months, and might lead into a PhD thesis project. Applications should include a CV, a motivation letter, and the names and email addresses of two references, and should be sent via email before the application deadline of **February 1st, 2012**.

