

A virtual environment for the robust design of multi-stage materials processes in the presence of uncertainty¹

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Integration of reliability computations with an innovative continuum method of design sensitivity analysis will be proposed as a powerful and efficient approach to the probabilistic robust design of materials processes. A framework for reliability analysis, for computing the design sensitivities of reliability indices and performing multi-objective reliability-based optimization will be discussed. These developments can lead to a virtual process laboratory that will assist industry in reducing lead time for material, process and product development, in trimming the cost of an extensive experimental trial-and-error process development effort and in developing processes for tailored material properties.

¹Presented at the DARPA workshop on 'treatment of uncertainty and error propagation in modeling, simulation, experiments and optimization', Annapolis, MD, August 27-28, 2001.