

# Problem reduction, renormalization and memory

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**Abstract:** The purpose of the talk is to give an overview of methods for the reduction of the complexity of computational problems, both time-dependent and stationary. In general, problem reduction leads to memory effects. I will present a brief introduction to renormalization methods and the Mori-Zwanzig formalism and how they can account for the memory effects. Illustrative examples will be provided.

If time permits, I will discuss how one can use dimensionally reduced models to perform more efficiently tasks like filtering and mesh refinement.