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Real-time data assimilation with reduced-order models

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ABSTRACT

Data assimilation is the process by which experimental measurements are incorporated into the modelling process of a given system. We focus here on the framework of non-linear solid mechanics. Applications of the developed methodology include real-time monitoring and control of structures or augmented reality, to name a few. In these circumstances, the real-time performance of the method is crucial to provide the user with robust predictions about the behaviour of the experimental system.

To achieve real-time feedback rates, the model (also known as *physical prior*) and its solution play a fundamental role. Given the inherent non-linear character of the problems here considered, we employ reduced order techniques in order to obtain such feedback rates. Examples are provided on realistic models that show the performance of the proposed technique.

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