

Characterizing Dynamic Data Driven Applications Systems (DDDAS) in Terms of a Computational Model

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Abstract. The DDDAS (Dynamic Data Driven Applications Systems) concept creates new capabilities in applications and measurements, through a new computational paradigm where application simulations can dynamically incorporate and respond to online field-data and measurements, and/or control such measurements. Such capabilities entail dynamic integration of the computational and measurement aspects of an application in a dynamic feed-back-loop, leading to unified SuperGrids of the computational and the instrumentation platforms. Examples of advances in applications capabilities enabled through DDDAS over traditional computational modeling methods, and advances in measurements methods, and instrumentation and sensor network systems, have appeared extensively in the literature. This paper concentrates in discussing a computational model representing the unified DDDAS computation-measurement environments, and asymptotic cases leading to traditional computational environments, data assimilation, and traditional control systems.

Keywords: computational model, applications, measurements, dynamic runtime, sensors, grids.

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