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I. Introduction

Modern Cyber-Physical Systems (CPS) are technical systems that combine mechanical, electronic, and software subsystems with physical elements embedded in the real world.

The development of CPSs is becoming increasingly complex and challenging, due to their interdisciplinary nature and the need to ensure seamless integration between their physical and computational components. [3]

Model-Based Systems Engineering (MBSE)

Model-Based Systems Engineering (MBSE) has become a cornerstone methodology for managing the complexity of modern Cyber-Physical Systems (CPS). The development of CPSs is inherently challenging because they combine software with hardware embedded in the physical world. MBSE has become the industry standard for the development and design management of these complex systems, extending the classical systems engineering by utilizing a centralized system model. [1]

By emphasizing the use of **formal models** throughout the system lifecycle, MBSE supports the design, analysis, and verification of system representations, promoting consistency, traceability, and reusability across engineering processes. MBSE enables system architects to respond more quickly and effectively to numerous changes in requirements that occur during the development process.

In this context, the Models are crucial for specifying the high-level, architecture, functionality, uses cases, requirements, and constraints of the technical systems.

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