Mathematical Problems in Engineering

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Special Issue on

Cyber-Physical Systems in Manufacturing and Service Systems

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Cyber-physical systems (CPS) are engineered systems that are built from, and depend upon, the seamless integration of computational algorithms and physical components. Unlike more traditional embedded systems, a full-fledge CPS is typically designed as a network of interacting elements with physical input and output instead of as standalone devices and is closely tied to concepts of sensor networks. Tremendous progress has been made in advancing CPS technology over the last five years. New smart CPS will drive innovation and competition in sectors as diverse as aerospace, automotive, chemical process, civil infrastructure, energy, healthcare, manufacturing, and transportation. One example of CPS is an intelligent manufacturing line, where the machine can perform many work processes by communicating with the components. Ongoing advances in science and engineering will improve the link between computational and physical elements, dramatically increasing the adaptability, autonomy, efficiency, functionality, reliability, safety, and usability of cyber-physical systems. The US National Science Foundation (NSF) has identified cyber-physical systems as a key area of research.

The main focus of this special issue will be on the new advances and their applications in mathematical modeling, control, and optimization for complex engineering systems, especially in industry applications such as manufacturing, transportation, and energy. The special issue enables researchers worldwide to report their special emphasis on the technical advances proposed within the last five years.

Potential topics include, but are not limited to:

- CPS for networked manufacturing processes, systems, and applications
- Advances in cloud manufacturing and supply chain
- Advanced modeling and coordinated control for industrial processes
- Intelligent sensing technology and instrumentations
- Real-time production planning and adaptive control
- Intelligent transport systems and electric vehicles
- Smart control in smart grid and energy management in industries

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