



Department of Systems Engineering

香港城市大學
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Control/Communication Codesign of Distributed Cyber-Physical Systems

In modern cyber-physical systems (CPS), multiple control applications typically share a common distributed computing platform, often spanning an edge-cloud continuum. This transition from dedicated, federated architectures to integrated platforms introduces complex timing behaviors, particularly variable and increased communication delays. These delays—arising from resource sharing and long-range 5G communications—can degrade control performance and, if left unmanaged, even destabilize the system. This talk presents a control/communication codesign framework that integrates delay compensation into both controller synthesis and task scheduling. The framework generates high-quality, stable CPS designs on distributed platforms. By explicitly accounting for the timing effects of shared computational and communication resources, this approach ensures robust and predictable control performance, even in highly dynamic environments.

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Speaker

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Prof. Zebo Peng received his PhD in Computer Science from Linköping University in 1987. He has been Professor and Director of the Embedded Systems Laboratory at Linköping University since 1996. He is currently also Vice-Chairman of the Department of Computer and Information Science. He was the head of the Swedish National Graduate School in Computer Science (CUGS) and the Chair of the IEEE European Test Technology Technical Council (ETTTC). Prof. Peng's research interests include the design and testing of embedded systems, cypher-physical systems, electronic design automation, SoC testing, and real-time systems. He has published more than 400 technical papers and five books in these areas. He has received four best paper awards and one best presentation award at major international conferences. Two of his publications have been selected as the most influential papers of 10 years of DATE (the Design, Automation, and Test in Europe Conference). He has been a Golden Core Member of the IEEE Computer Society since 2005 and received the IEEE Computer Society Distinguished Contributor Award in 2022. He has served on the program/steering committee of a dozen international conferences and was Program Chair for DATE 2008, Program Chair for ETS 2007 and 2013, and General Co-Chair for ITC-Asia 2021.

