

IFAC 2020 Open Invited Track

Modelling, identification and control of quantum systems

Organizers

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Abstract: The emerging quantum technology has been changing our life. The theory and methods for modelling, identification and control of quantum systems are fundamentally important for enabling the industrialization of quantum technologies including quantum computation, communication and metrology. This open invited track provides a forum for idea exchange in the active research area of modelling, identification and control of quantum systems, as well as their applications to practical quantum technologies.

A detailed description of the topic: Quantum Technology has been recognised as one of the most promising frontier technologies. Although great progress has already been made, more intensive fundamental research is still needed for this area to reach its full capacity in order to foster broader practical applications. Many problems in this area can be formulated as quantum estimation and control problems. The rapid development of quantum technology also creates new challenges in systems control theory since the dynamics of quantum systems are fundamentally different from those of classical systems, such as quantum entanglement (a unique quantum correlation) and quantum coherence (a wave-like property of quantum systems allowing for constructive and destructive interference).

The purpose of this open invited track will be to provide an account of the state-of-the-art in this fast moving and cross-disciplinary field. Topics include but not limited to

- Modelling and analysis of quantum control systems
- State estimation of quantum systems
- Hamiltonian identification of quantum systems
- Parameter identification of open quantum systems
- Linear quantum systems theory
- Quantum optimal control
- Quantum robust control
- Quantum measurement-based feedback and quantum coherent feedback
- Learning control of quantum systems
- Quantum control applications in molecular systems, quantum metrology and quantum information