Track Title: Control and operability of intensified and modular industrial manufacturing systems

Description of the topic:

Process intensification (PI) is 'any chemical engineering development that leads to a substantially smaller, cleaner, safer, and more energy efficient technology', as defined by Stankiewicz and Moulijn [1]. PI has been gaining increasing momentum from the chemical engineering research community and the chemical/energy industry during the past several decades, as the challenges that process industries face to enhance their economic, environmental and safety performance have led to the development and incorporation of PI solutions.

Several Process Systems Engineering (PSE) based approaches have been proposed in the literature to address the synthesis, design, and optimization of PI systems [2,3,4,5]. However, the operational performances (e.g., flexibility, safety, controllability) in the resulting intensified designs, which are crucial to practical implementation, are mostly neglected at this synthesis stage.

Challenges in the control and operation of PI systems can arise as the combination of multiple process operations in a single intensified unit results in a reduction of the degrees of freedom, limiting control opportunities and rising safety concerns [6]. Furthermore, the steady-state and dynamic models that are widely used for the description of intensified systems are coupled and highly nonlinear, making the construction of accurate approximation representations for the reduction of the computational complexity, challenging [7].

Therefore, this track will focus on new advancements for the development of advanced control strategies and operability, safety and flexibility analysis of intensified industrial manufacturing systems.

References:

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