

Delay and functional differential equations and applications

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In several mathematical models, the evolution of a system may depend not only on its current state but also on some of its past values, which influence the state only after some delay. Such models arise from several applications, ranging, for instance, from biology, where delays may model maturing processes such as incubation periods or gestation times, to engineering, where delays are commonly used to model propagation or transmission phenomena that do not occur instantly.

Motivated by such applications, mathematicians from several backgrounds have considered systems with delays, or, more generally, functional differential equations, a theory that has flourished in the second half of the 20th century and is still the subject of much study, with many interesting problems yet to be explored.

This special session aims at bringing together mathematicians from different backgrounds working on systems with delays and functional differential equations. Topics studied by the speakers we have invited include the analysis of stability and control of hyperbolic PDEs through classical transformations into difference equations, qualitative behavior of some ODEs with delays stemming from models in biology, the effects of delays on the stability of a system, the design of controllers that take into account delays in measurements, evolution equations with time delays, or algebraic methods for the study of differential delay operators, among others.

List of speakers

- **Islam Boussaada**
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- **Delphine Bresch-Pietri**
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- **Walid Djema**
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- **Guilherme Mazanti**
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- **Rosane Ushirobira**
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