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OPTIMISATION TECHNOLOGIES
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AND APPLICATIONS

OPTiMA SEMINAR SERIES

MINIMIZING THE RISK OF SPREADING PROCESSES VIA SURVEILLANCE SCHEDULES AND SPARSE CONTROL

Epidemics, computer viruses and bushfires can all be thought of as spreading processes in which an initial localized outbreak spreads rapidly to neighbouring nodes and throughout a network. The real-world risks associated with these events have sparked significant research into methods for modelling, prediction, and control.

In this talk, we propose an optimisation framework that combines surveillance schedules and sparse control to bound the risk of spreading processes. Here, risk is considered the product of the probability of an outbreak and the impact of that outbreak. We can bound or minimise the risk by resource allocation and persistent monitoring schedules. The presented framework utilises the properties of positive systems and convex optimisation, in particular exponential cone programming, to provide scalable algorithms. We demonstrate how the method can incorporate different parameters and scenarios, such as a vaccination strategy for epidemics and the effect of vegetation and weather for bushfires.

Vera Somers is a PhD candidate at the Australian Centre for Field Robotics at the University of Sydney. She received the BSc and MSc degrees in Aerospace Engineering from Delft University of Technology, the Netherlands. She was a Research Assistant with the Humans and Autonomy Lab at Duke University, USA. Her research interests include control, simulation and optimisation of complex networks and spreading processes.

WED 11 AUG 4PM - 5PM AEST

ZOOM MEETING ID: 840 4714 8969; PASSWORD: 546650

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