

Ca' Foscari University of Venice

Department of Molecular Sciences and Nanosystems

Department of Environmental Sciences, Informatics and Statistics

Francesco Mezzadri
Università di Modena e Reggio Emilia

CAMPUS Math Talks
Splitting methods for complementarity problems: theory and applications

Organizzazione a cura di:
Nicola Ferro
Giulia Bevilacqua
Marta Strani
(DSMN)

Gabriele Santin
Damiano Pasetto
(DAIS)

15 dicembre 2026 - 14.00-15.00
Aula Delta 2B, Edificio Delta, Campus Scientifico

Link Zoom: https://unive.zoom.us/j/89773649575?pwd=dmJWYuqHmtXuJh3rWWgyE7vFaqLBLI.1
ID riunione: 897 7364 9575
Passcode: xS8bz7

Complementarity problems arise in a wide range of applications in science and engineering and have therefore been extensively studied. Yet, new numerical methods for their solution continue to be proposed and analyzed.
In this talk, we discuss recent developments in the numerical solution of horizontal linear complementarity problems (HLCPs) and of their weighted generalization (WHLCPs). After an overview of these problems and their applications, we focus on two classes of iterative schemes based on matrix splittings, namely projected and modulus-based splitting methods. We provide insights into their formulation and convergence, and highlight connections with other topics in numerical linear algebra, such as absolute value equations (AVEs). We also show that, when the weight vector of a WHLCP vanishes, projected methods and their convergence analysis naturally reduce to the HLCP case, thus providing a unified solution framework for the two problems.
Finally, we present numerical experiments showing that the considered methods are competitive with recently proposed approaches, especially for sparse problems. In particular, for HLCPs, we focus on the modeling of cavitation in lubricated contacts, where the problem arises from the discretization of the Reynolds equation combined with a physical cavitation model. For WHLCPs, we illustrate the meaning of the weighting term in some applications and discuss the implementation of the methods.