Speaker: Walaa M. Moursi
Affiliation: University of Waterloo

Talk title:
Strongly nonexpansive mappings revisited: uniform monotonicity and operator splitting

Talk Abstract:
The correspondence between the class of nonexpansive mappings and the class of maximally monotone operators via the reflected resolvents of the latter has played an instrumental role in the convergence analysis of the splitting methods. Indeed, the performance of some of these methods, e.g., Douglas–Rachford and Peaceman–Rachford methods hinges on iterating the so-called splitting operator associated with the individual operators. This splitting operator is a function of the composition of the reflected resolvents of the underlying operators. In this talk, we provide a comprehensive overview of the class of uniformly monotone operators and their corresponding reflected resolvents. We prove that the latter is closely related to the class of the strongly nonexpansive operators introduced by Bruck and Reich. Connection to duality via the inverse operators is also presented. When the underlying operators are subdifferentials of proper lower semicontinuous convex functions better duality results hold. We provide applications to Douglas–Rachford and Peaceman–Rachford methods. Examples that illustrate and tighten our results are presented.