Crowd motion paradigm modeled by a bilevel sweeping control problem

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In this talk, we will work with the following crowd motion model: a population confined to a particular closed space, for example, a cinema room, is trying to exit the room in the minimal possible time. This population features a specific structure, in the sense that it is constituted of groups of individuals each one remaining in its moving set, where each group intends to minimize its effort to achieve this. This problem is a perfect example of a model which combines two areas of optimization which were never related: sweeping process and bilevel optimization. For this crowd motion problem, we will establish the corresponding necessary optimality conditions, therefore providing information on the set of optimal solutions. We refer the reader to [LPK22] for more details.

[LPK22] Fernando Lobo Pereira and Nathalie T Khalil. A maximum principle for a time-optimal bilevel sweeping control problem. *Journal of Optimization Theory and Applications*, 192(3):1022–1051, 2022.