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Set of Sustainable Thresholds: An Approach to Operationalize Sustainability Definitions

What is the ability of a natural resource to satisfy some constraints (objectives), usually in conflict, from now over time? (e.g., to sustain a minimal level of biomass and to get a minimum profit due to harvesting). What is the minimal percentage of infected people that a city can sustain as upper bound for a given healthcare budget? The viability theory has addressed this type of problems for more than 30 years. In general, given a controlled dynamical system under state and control constraints, the idea is to find the initial conditions (e.g., current state of a natural resource or current percentage of infected people), for which it can be assured there exists a future viable trajectory, that is, a way to manage the associated dynamical system over time in order to satisfy the desired constraints. The set of these (initial) states is called the viability kernel, a key concept in the mentioned theory.

During last years we have analyzed a different problem but strongly related: given an initial condition, what are the constraints (parametrized by thresholds) that can be satisfied from now on? We call the set of these constraints the set of sustainable thresholds, which actually is the inverse mapping of the viability kernel.

In this talk I will present some interpretations of the set of sustainable thresholds, advantages with respect the viability kernel, methods for computing this set, and applications related to fishery management and epidemiology.

Date:	June 12, 2019
Place:	Room C1/028
Time:	12:00

