

Invites you to a webinar on



Stochastic Control of Ecological Networks



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Dr. Arnaud Dragicevic is a senior researcher in bioeconomics at the French National Research Institute for Agriculture, Food and Environment (INRAE). He holds a Ph.D degree from École Polytechnique (IP Paris) and an Sc.D degree or Habilitation from the Aix-Marseille School of Economics (AMU). His research interests include bioeconomics, socio-ecological systems and sustainable development. The modeling tools he holds in high regard are the graph- and game-theoretic settings seen as governed by evolutionary dynamics

The talk highlights the maintenance of ecological networks in forest environments, built from bioreserves, patches and corridors, when these grids are subject to random processes such as extreme natural events. It also outlines a management plan to support the optimized results. After presenting the random graph-theoretic framework, we apply the stochastic optimal control to the graph dynamics. Our results show that the preservation of the network architecture cannot be achieved, under stochastic control, over the entire duration. It can only be accomplished, at the cost of sacrificing the links between the patches, by increasing the usage of the control devices. This would have a negative effect on the species migration by causing congestion among the channels left at their disposal. The optimal scenario, in which the shadow price is at its lowest and all connections are well-preserved, occurs at half of the course, be it the only optimal stopping moment found on the stochastic optimal trajectories. In such a scenario, the optimal forestry management policy has to integrate agility, integrated response, and quicker response time. The management plan in the paper, therefore, highlights the latest technological and management tools to address the optimal solution.

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