Optimal Control of Boundary Hostility for Interacting Populations

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Abstract. We consider boundary control for a parabolic system describing the evolution of two interacting populations (species) in a bounded habitat. The control models the hostility of the boundary environment towards the species. The objective functional represents the balance between the ecological benefit, modeled by the size of the two populations, and the economic cost of maintaining an ecologically favorable boundary environment, modeled by the boundary friendliness. The unique optimal control is characterized in terms of the solution of the optimality system, which consists of the state system coupled with an adjoint system.

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