

# Optimal Control of Integrodifference Population Models

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## Abstract

Integrodifference equations are models that are discrete in time and continuous in space. These equations model populations with discrete generations with separate growth and dispersal stages. The dispersal is modeled by an integral of the population density (after the growth) against a kernel. Optimal control of such a hybrid equation is a new area and involves a combination of the techniques from the discrete version of Pontryagin's Maximum Principle and from control of partial differential equations. Analysis and characterization of an optimal harvesting control will be given using an adjoint equation. Numerical algorithms and illustrations will be included for a variety of dispersal kernels and growth functions.