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# Optimal Harvesting Modelling

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Report 1

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## Abstract

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## 1 Problem Framework

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## 2 Deterministic Model.

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### 2.1 Logistic Equation.

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### 2.2 Optimization problem.

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$$\min_{u \in U_{\text{ad}}} J(u) = \frac{1}{2} \|y - y_0\|_{L^2(\Omega)}^2 + \frac{\alpha}{2} \|u\|_{L^2(\Omega)}^2 \quad (\text{P})$$

subject to,

$$-Ay + \phi(y) = u \quad \text{in } \Omega, \quad (2.1)$$

$$y = 0 \quad \text{on } \partial\Omega \quad (2.2)$$

and the pointwise constraints,

$$u_a \leq u(x) \leq u_b \quad \text{for almost every } x \in \Omega, \quad (2.3)$$

$$y_a(x) \leq y(x) \leq y_b(x) \quad \forall x \in K \subset \Omega, \quad (2.4)$$

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#### 2.2.1 Optimal Control.

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#### 2.2.2 Error Analysis.

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### 3 Optimizing Algorithms and Simulation.

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#### 3.0.1 Algorithm.

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#### 3.0.2

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## 4 Presence of Noise

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## 5 Further Research

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