Cyclical versus non-cyclical harvesting policies in renewable resource economics

Abstract: In this work, we explore the link between cyclical and non-cyclical resource exploitation. As already shown by Wirl in the context of a continuous control model with capital- and resource stock dynamics, the form of the cost function is essential to explain the cyclical or non-cyclical nature of optimal solutions. We get inspiration for our analysis from this result, but study a case where only the dynamics of the resource stock is considered. We define an impulse control framework and study the impact of different stock dependent cost functions on the type of solution. We show that the optimal harvesting behavior derived from this model can either be cyclical or be associated to a Most Rapid Approach Path solution, like the one in Clark's continuous control model, depending on the cost function that is used.

Wirl, F.(1995) The Cyclical Exploitation of Renewable Resource Stocks May Be Optimal. Journal of Environmental Economics and Management 29, 252-261.
Clark, C.W. (1990). Mathematical Bioeconomics, The Optimal Management of Renewable Resources, John Wiley and Sons.