

Title: Optimization of the concentration changes in a chemostat with one species under biomass retention

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Abstract: In this work, we study the problem of driving in minimal time a system describing a chemostat model to a target point under variation of the dilution rate. The particularity is that biomass retention is taken into account in the usual model of a single biomass and a single substrate. Using the Pontryagin's Maximum Principle and geometric control theory arguments, we depict an optimal synthesis and provide an optimal feedback control of the problema considering both Monod and Haldane growth functions and under different values of the biomass retention constant.