Thesis Title Dynamic Behavior of a Membrane Permeability Sensitive Model for a Continuous Bioreactor

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ABSTRACT

We investigate the dynamic behavior of a continuous stirred tank reactor modelled by cells and substrate balance equations which have been extended to incorporate the effect of external forces on the cell membrane permeability. Bifurcation analysis done on the system of three ordinary non-linear differential equations which comprises the model shows that it can simulate oscillatory behavior and more complex dynamic behavior which have been frequently observed in experimental data. Studies is carried out to identify parametric ranges for which we can expect undesirable complex situations that can compromise the quality of the effluent.