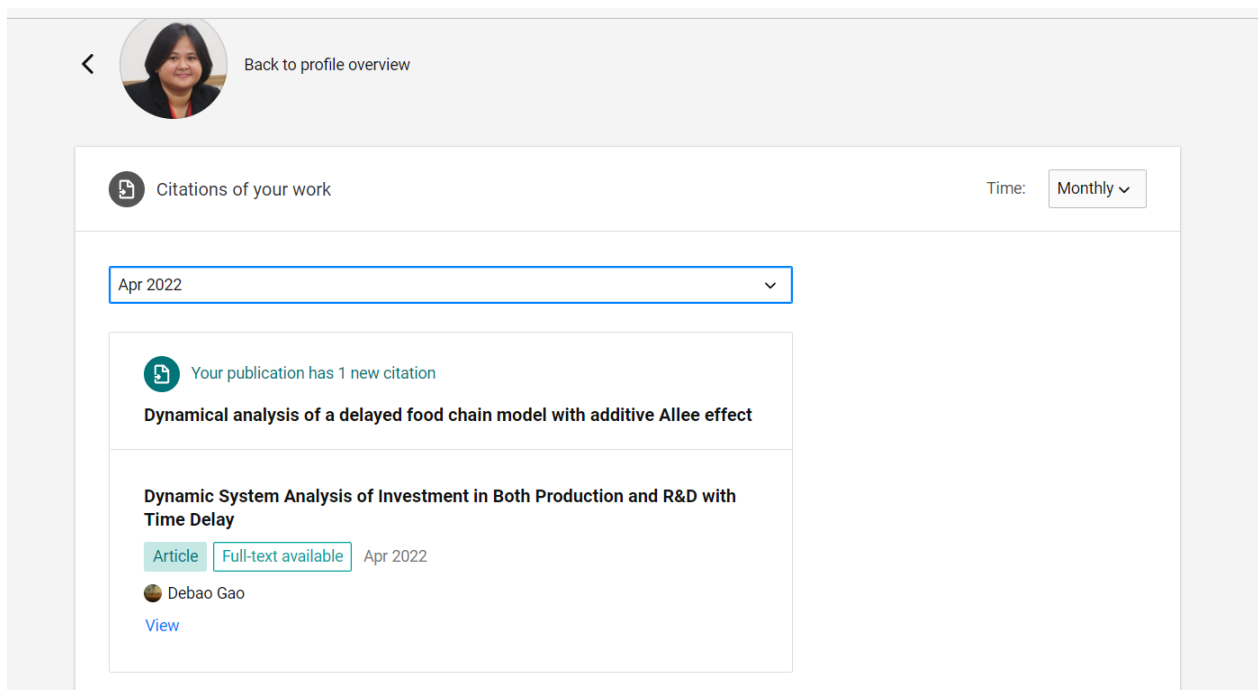


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Dynamic System Analysis of Investment in Both Production and R&D with Time Delay

Debao Gao ¹
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Abstract

This paper, according to the process of capital return, establishes a differential dynamics model of investment with two time delays. When both time delays are zero, it is proved that the model is positively invariant, uniformly bounded, and globally asymptotically stable by using the comparison principle and Bendixson–Dulac theorem. When at least one time delay is not zero, according to Hopf bifurcation theorem, the conditions of local asymptotic stability and existence of periodic solution of investment model are obtained. By using the normal form theory and the center manifold theory, the discriminant formula of periodic solution property of investment model is given. Under the condition of controlled time delay, the model is numerically simulated to verify the correctness of relevant analytical conclusions. Therefore, the investment model describes the dynamic process and development trend of project investment quite closely.

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