
A Study on National Economy using a Higher order Dynamical System

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Higher order Dynamical systems are now used in all areas of Science. In particular, higher order dynamical systems in economics have been developed rapidly because of the dynamic nature of the economy in the view of applications and use of the computer technology in the view of analyzing tools.

In this work we have developed a second order affine dynamical system that models the economy. This dynamical system is a variation of the Samuelson accelerator-multiplier model which was first developed in 1939.

Three assumptions on Consumer Spending, Investment and Government Spending were considered in this model by which we could understand how each component of the model affects the long-term behavior of the economy. Once we understand how the behavior of the economy get affected by those assumptions, we can modify the existing components.

In this work we have modified the Government Spending assumption and investigated on how alternate approaches could affect the economy both positively and negatively. Results indicated that Immediate Government Response can stabilize unstable situations. So chaotic behavior is not applicable in these cases. If there is a delay in the Government Response, such as 1 or 2-time unit delay in action, the response could have either a deleterious effect or no effect at all. We further observed that, greater the delay, the effect of the government control could get worsen.

Key Words: *Dynamical System, delay, immediate government response*

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