ABSTRACT

SEASONAL ECONOMIC DATA AS APPROXIMATE HARMONIC OSCILLATORS

This paper draws the tentative conclusion that a single class of nonlinear, damped, forced, oscillator with delay can be used to describe the growth rates for both the indices of consumer durable and nondurable goods production. These data are monthly data from 1919 to 1988. The same class of model fits the entire period, although with parameter drift. The model is prescribed to track the seasonal components of the time series. However, the degree of fit as measured by R^2 has a low value of about 79% during the war years and is often in excess of 96%. Variations in the series at business cycle frequencies are re-expressed by this model in terms of drift in the values of the parameters. Examination of the Laplace transform of the linear approximation indicates that there has been a qualitative change in the dynamical properties of both series and that the two series also differ qualitatively; these conclusions are drawn based on an examination of the differences in the parameter values within the same class of model.

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