

Title: Regression With Periodically Correlated Errors: A New Model for Plant Growth

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Abstract:

Recent developments in the analysis of periodically correlated time series are used to analyze newly-developed data and construct a new model for plant growth. The data – carbon dioxide (CO_2) exchange rates in plants – were gathered using a novel and innovative system for near-continuous measurement of CO_2 exchange. Least squares estimates are derived for a piecewise polynomial trend, which carries over in an obvious fashion to a general linear model. The residuals from fitting this trend have seasonal components that are well-modeled using a periodic autoregressive moving average (PARMA) model. Standard errors for the least squares trend estimates are then derived based on the fitted PARMA model.