

Meeting: 1003, Atlanta, Georgia, SS 26A, AMS-SIAM Special Session on Dynamic Equations on Time Scales; Integer Sequences and Rational Maps, I

1003-39-789 **Chuang Peng*** (cpeng@morehouse.edu), Department of Mathematics, Morehouse College,
Atlanta, GA 30314. *Minimum Degrees of Polynomial Models on Time Series.*

This paper studies polynomial models of time series. The focus will be on minimum degrees of polynomial modeling, in particular, the minimum degrees for arbitrary tail row. The paper proves decomposition theorems to reduce the associated matrices of time series to various matrix blocks. The key idea is the augmented matrix of associated matrix. It gives a simple necessary and sufficient condition for existence of linear models. Moreover, it provides a new algorithm to get polynomial models, which shows that in many cases there will be quadratic or cubic models if linear model does not exist. As a corollary of new algorithm, it shows that the minimum degree is no greater than $m - \bar{l} + 1$ for a $m + 1$ step time series with augmented matrix of rank \bar{l} . As applications, the paper also calculated the minimum degrees for various matrix blocks. (Received September 29, 2004)