Application of delay-observer design to forecast of irregular time-series

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Various observers have been used for estimating directly immeasurable states of dynamical systems as well as estimating the derivatives of a time-series when the underlying model is unknown. This paper utilizes the concept of observer design for forecasting on relatively short time intervals future values and derivatives of irregular time series. This task is attained via feedback control of a polynomial model where observations are recorded with a certain delay. This allows us to express the forecast accuracy in terms of variability of a time-series and forecast horizon. Examples illustrating forecast of a financial time-series are presented.