

# On Real-Time Forecasting with Sample-Based Approximations to the Sequence of Posterior Predictive Distributions

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## Abstract

For the Bayesian, real-time forecasting with the posterior predictive distribution can be challenging for a variety of models. First, estimating the parameters of a time series model can be difficult with sampling-based approaches when the model's likelihood is intractable and/or when the data set being used is large. Second, once samples from a parameter posterior are obtained on a fixed window of data, it is not clear how they will be used to generate forecasts, nor is it clear how, and in what sense, they will be "updated" as interest shifts to newer posteriors as new data arrive. This paper provides an applied analysis of financial returns data using a well-established stochastic volatility model with several forecasting algorithms. Its principal aim is to provide guidance on how to tune different algorithms, how to quantify the uncertainty of different scoring measures, and to describe a variety of pitfalls with each approach.

*Keywords:* 3 to 6 keywords, that do not appear in the title

# 1 Introduction

## 2 Methods

### 2.1 Our Model

?

$$y_t = z_{1t} \exp[x_t/2]$$

$$x_{t+1} = \mu + \phi(x_t - \mu) + \sigma z_{2t}$$

$$\begin{bmatrix} z_{1t} \\ z_{2t} \end{bmatrix} \sim \mathcal{N} \left( \begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 & \rho \\ \rho & 1 \end{bmatrix} \right)$$

$$x_1 \sim \mathcal{N}(\mu, \sigma^2/(1 - \phi^2))$$

### 2.2 Particle Filtering

We particle filter with covariates:

## 3 Verifications

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## 4 Conclusion

### SUPPLEMENTARY MATERIAL

**Title:** Brief description. (file type)

**R-package for MYNEW routine:** R-package ?MYNEW? containing code to perform the diagnostic methods described in the article. The package also contains all datasets used as examples in the article. (GNU zipped tar file)

**HIV data set:** Data set used in the illustration of MYNEW method in Section 3.2. (.txt file)

## 5 BibTeX

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