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FORECASTING

PRINCIPLES AND PRACTICE

A comprehensive introduction to the latest forecasting methods using R. Learn to improve your forecast accuracy using dozens of real data examples.



3RD EDITION

 **OTexts**
OPEN TEXTS FOR PRACTICE

1. Getting started

1.7 The statistical forecasting perspective

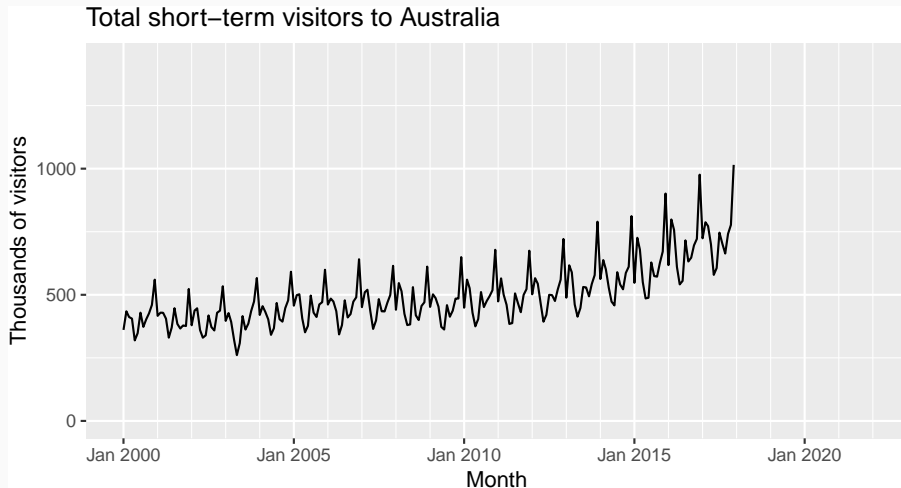
OTexts.org/fpp3/

Random futures

A forecast is an estimate of the probabilities of possible futures.

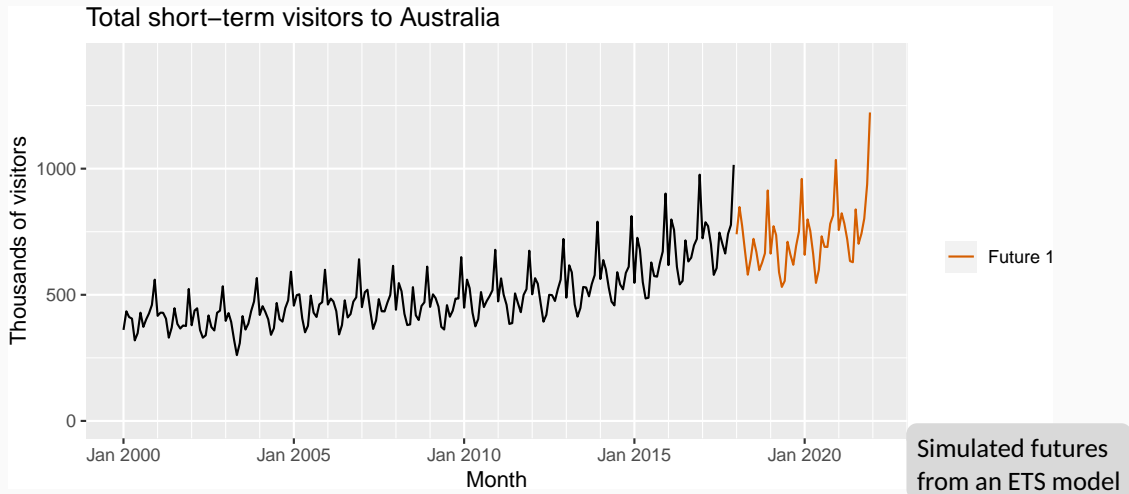
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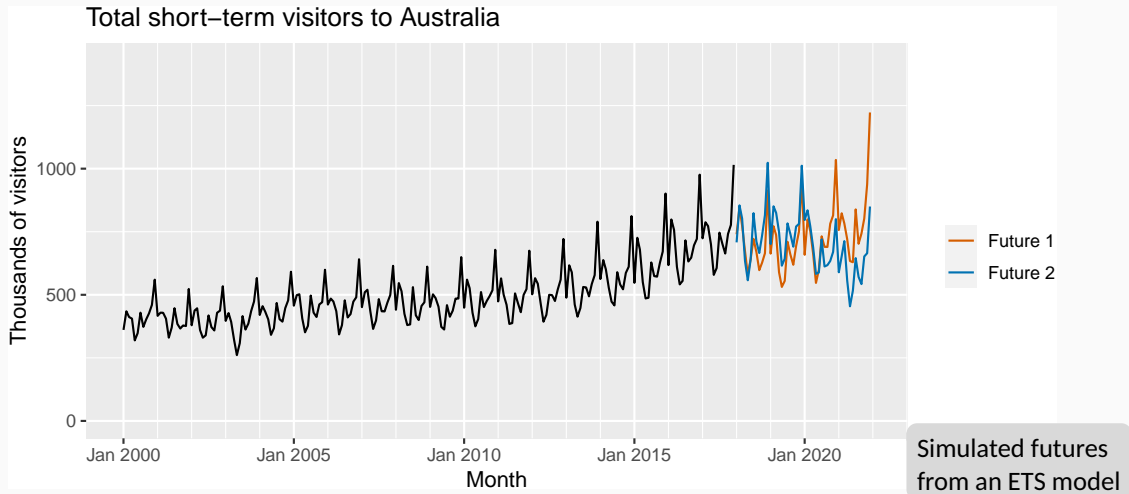
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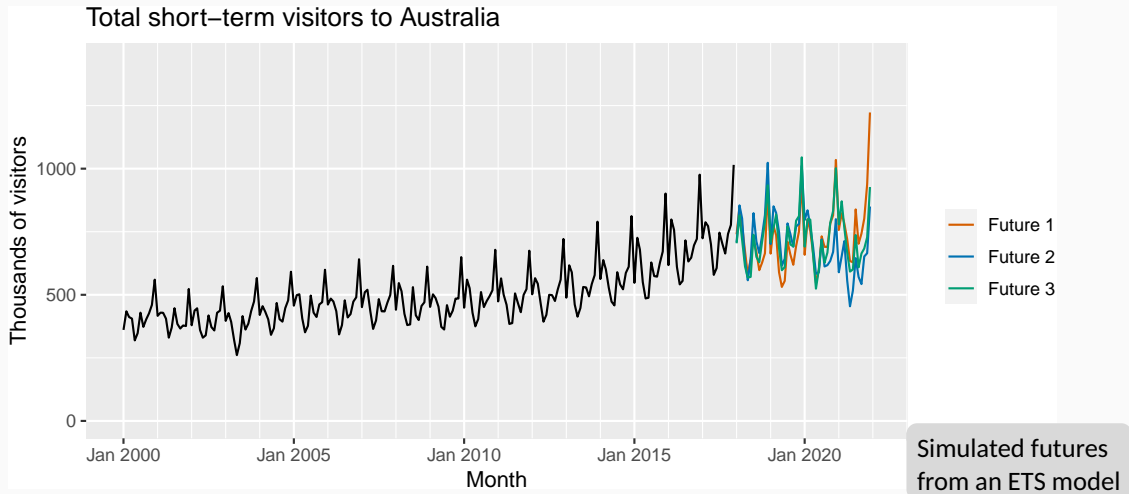
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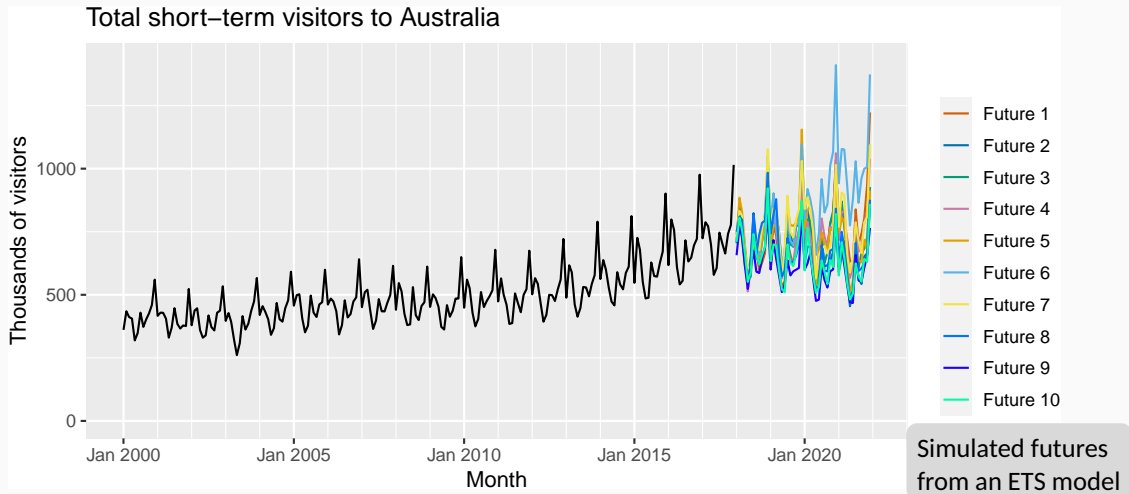
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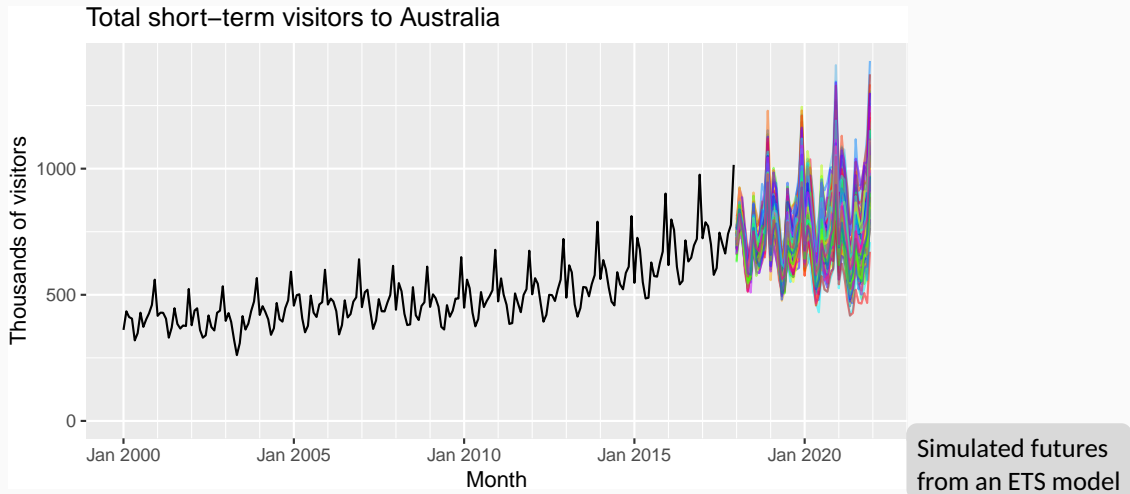
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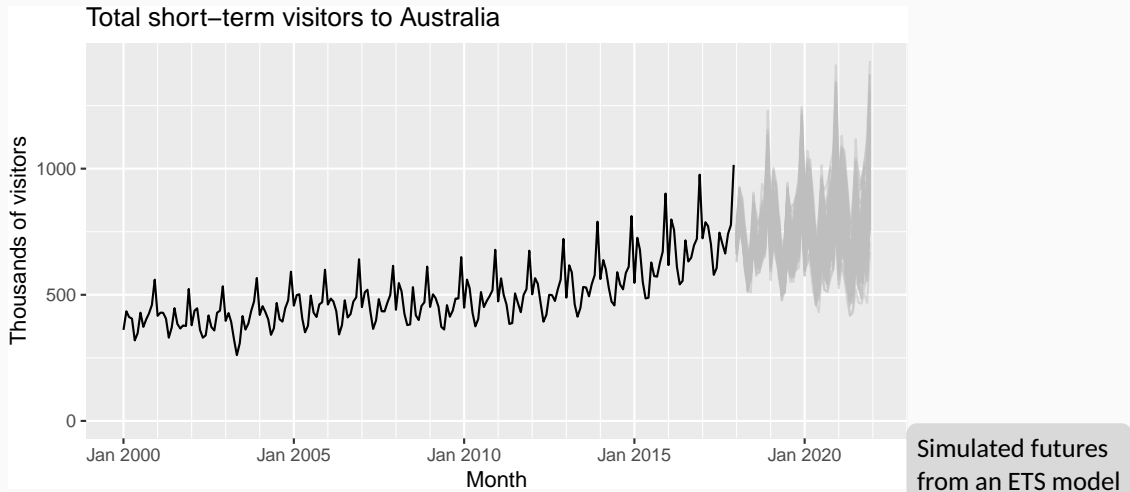
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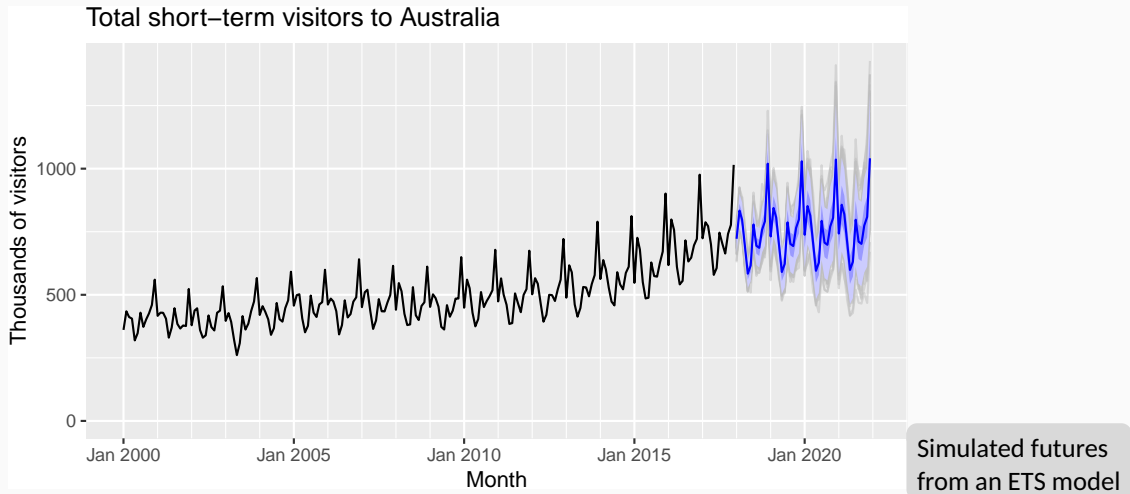
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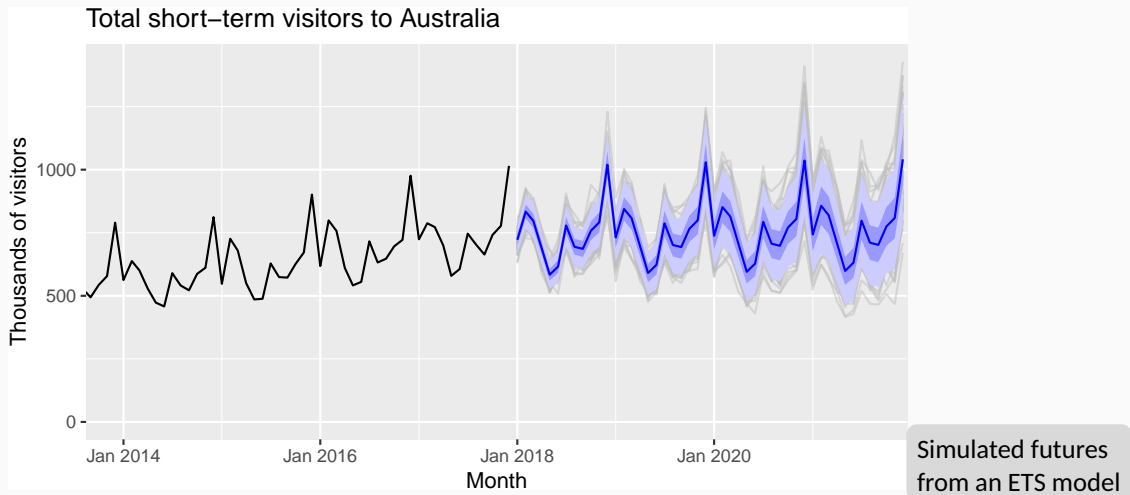
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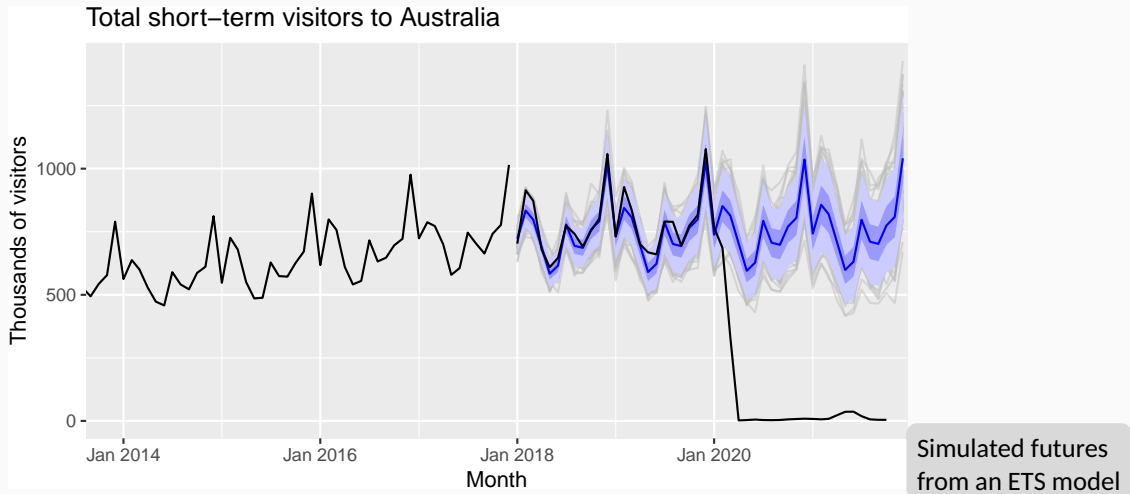
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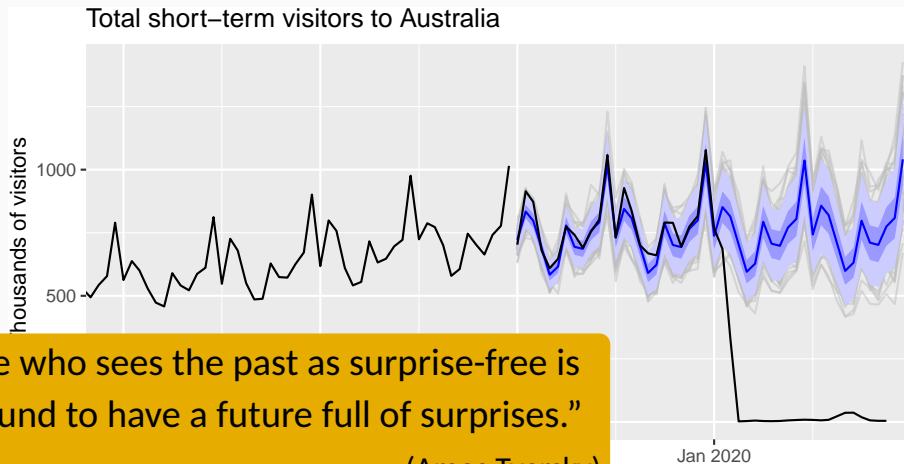
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“He who sees the past as surprise-free is bound to have a future full of surprises.”

(Amos Tversky)

Simulated futures
from an ETS model

Statistical forecasting

- Thing to be forecast: a random variable, y_t .
- Forecast distribution: If \mathcal{I} is all observations, then $y_t|\mathcal{I}$ means “the random variable y_t given what we know in \mathcal{I} .”
- The “point forecast” is the mean (or median) of $y_t|\mathcal{I}$
- The “forecast variance” is $\text{var}[y_t|\mathcal{I}]$
- A prediction interval or “interval forecast” is a range of values of y_t with high probability.
- With time series, $y_{t|t-1} = y_t|\{y_1, y_2, \dots, y_{t-1}\}$.
- $\hat{y}_{T+h|T} = E[y_{T+h}|y_1, \dots, y_T]$ (an h -step forecast taking account of all observations up to time T).