Statistics and Data Analysis

Unit 06 – Lecture 08: Diagnostics and SARIMA Models

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https://github.com/tali7c/Statistics-and-Data-Analysis

Quick Links

Overview Diagnostics SARIMA Exercises Demo Summary

Agenda

Learning Outcomes

- Explain why diagnostics are needed after fitting

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- Explain why diagnostics are needed after fitting
- Recognize residual autocorrelation as model issue
- Explain SARIMA seasonal terms at a high level
- Choose seasonal period s (weekly/monthly/yearly)

Diagnostics: Key Points

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- Check stability of variance

SARIMA: Key Points

- ARIMA(p,d,q) x (P,D,Q,s)

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- ARIMA(p,d,q) x (P,D,Q,s)
- Seasonal differencing D
- s is the seasonal period

Exercise 1: Residual goal

After fitting, what should residuals look like ideally?

Solution 1

- White noise: no pattern, no autocorrelation.

Exercise 2: Seasonal period

Daily data with weekly seasonality: what is s?

Solution 2

- s=7

Exercise 3: Why seasonal

Why add seasonal terms?

Solution 3

- To capture repeating seasonal dependence.

Mini Demo (Python)

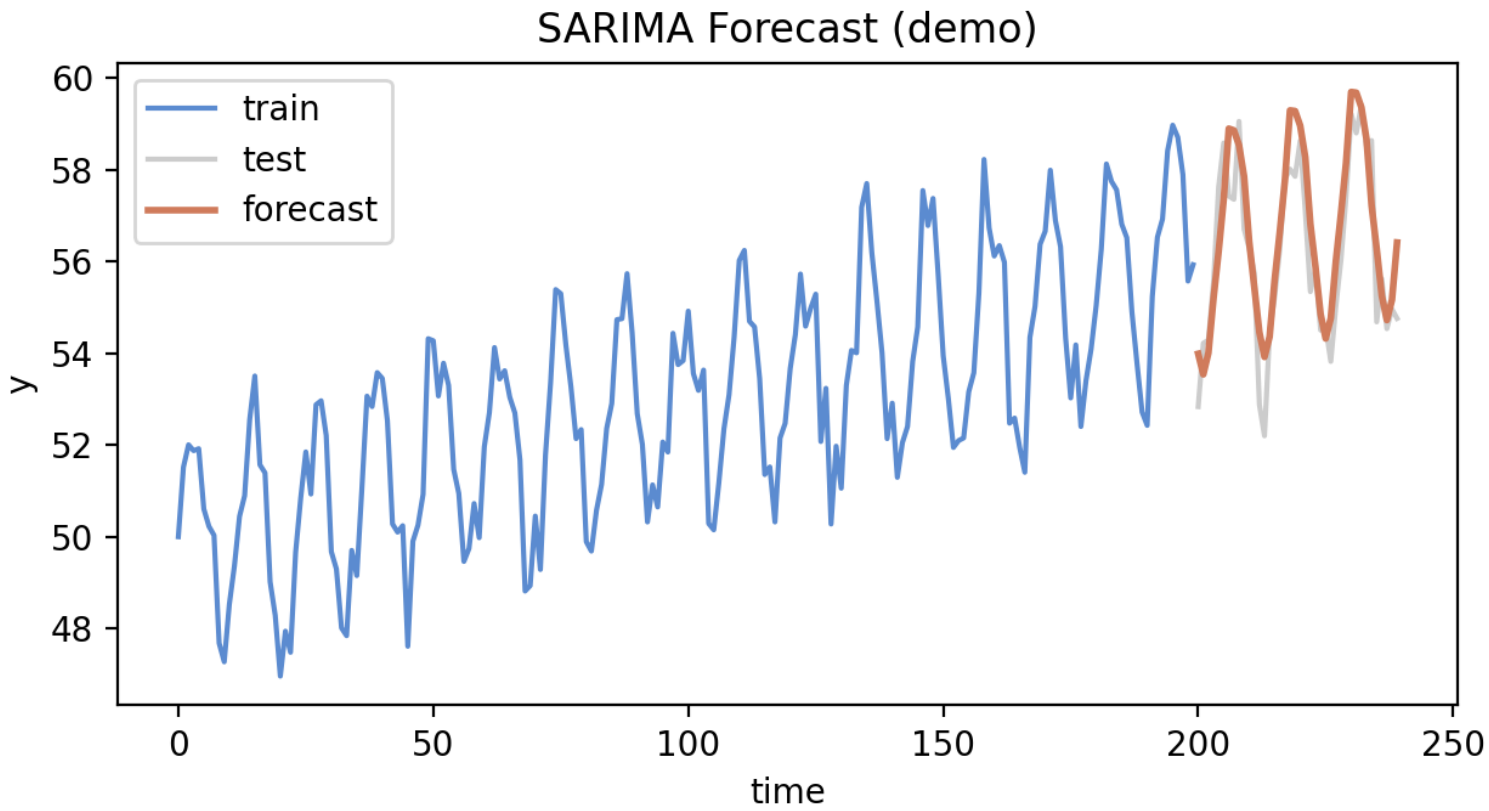
Run from the lecture folder:

```
python demo/demo.py
```

Outputs:

- `images/demo.png`
- `data/results.txt`

Demo Output (Example)



Summary

- Key definitions and the main formula.

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- How to interpret results in context.

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- How to interpret results in context.
- How the demo connects to the theory.

Exit Question

What is one residual symptom that suggests your model is inadequate?