

Applied Time Series Analysis

1. Introduction

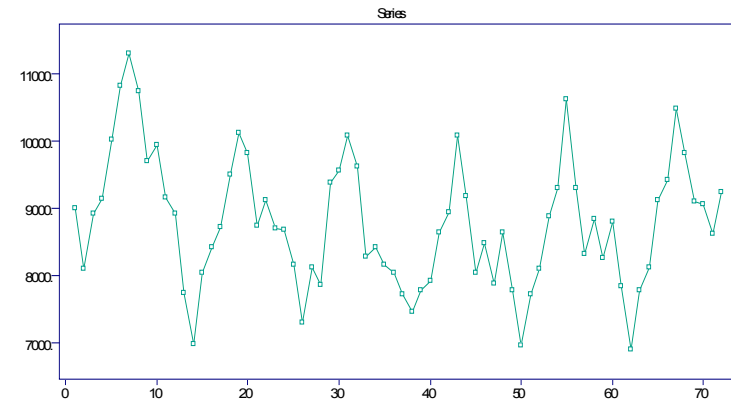
Examine time series plots for:

- trend over time;
- seasonal/cyclical/periodic components;
- changing variability over time;
- “carry-over” effects from past;
- other systematic features.

1.1 Examples:

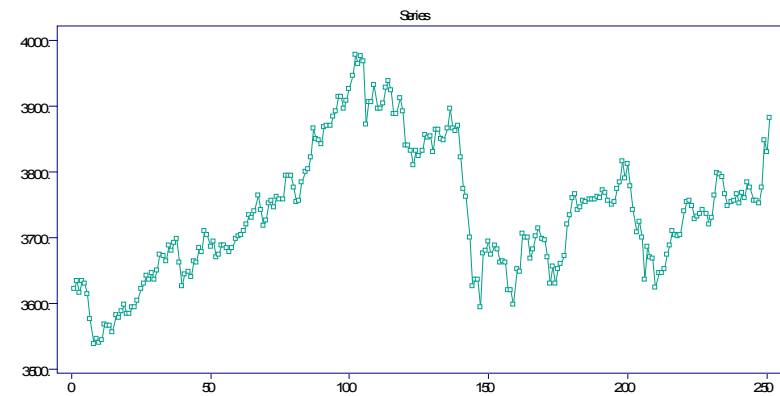
Accidental Deaths in U.S.A. (DEATHS.TSM)

- Monthly totals: January 1973 to December 1978.
- Strong seasonal pattern: high in July, low in Feb.



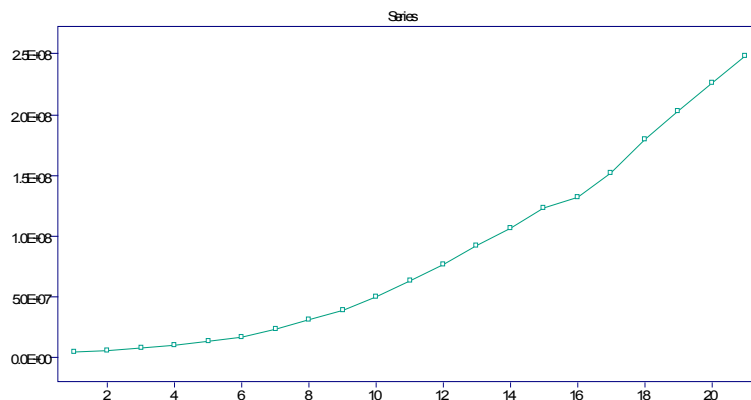
Dow-Jones Index (DJO2.TSM)

- Closing prices on 251 consecutive trading days, ending 08/26/94.
- A Random Walk?



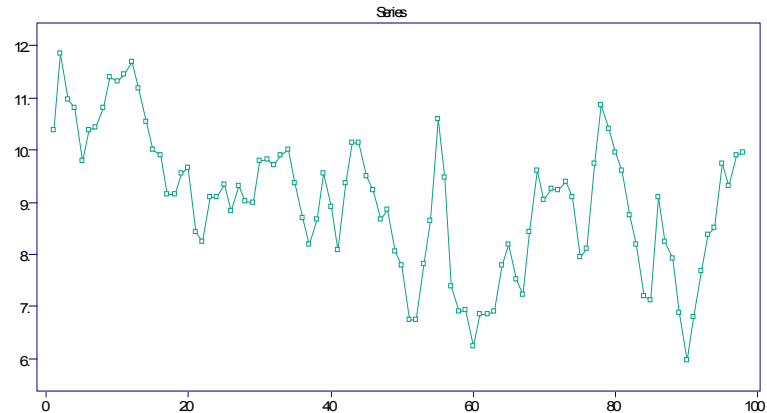
U.S.A. Population (USPOP.TSM)

- Ten-year intervals: 1790 to 1990.
- Exponential trend.
- Little or no random variability.



Level of Lake Huron (LAKE.TSM)

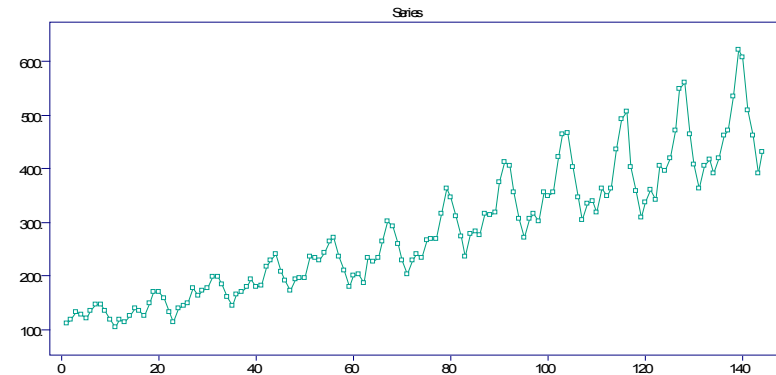
- Annual levels (feet): 1875-1972.
- Linearly (?) decreasing trend.



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International Airline Passengers (AIRPASS.TSM)

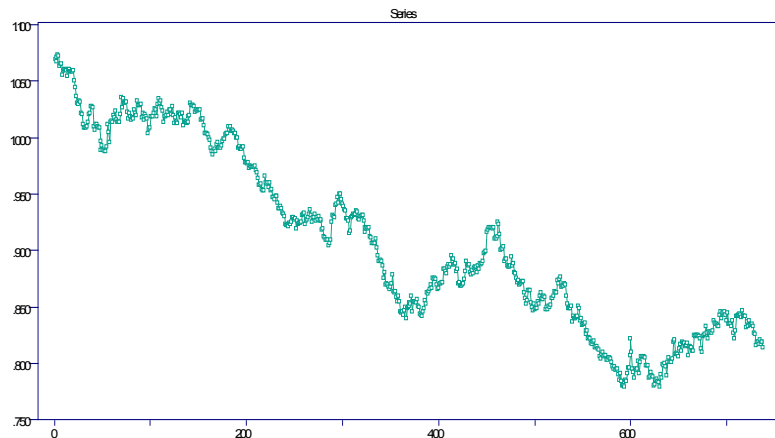
- Monthly totals: January 1949 to December 1960;
- Strong seasonal effect: high in summer, low in winter.
- Linearly (?) increasing trend.
- Increasing variability.



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US Dollar – Euro Exchange Rate

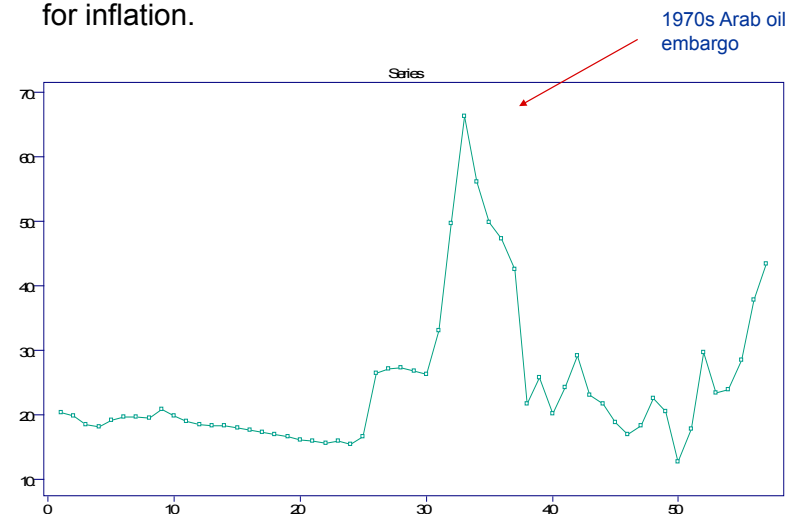
- Daily averages: May 30, 2002 to June 5, 2004.
- Downward spiral?



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Price of a barrel of oil (dollars)

- Annual averages from 1949 to 2005, adjusted for inflation.



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