TS Module 8 Non-stationary time series basics

(The attached PDF file has better formatting.)

- Variable transformations
- Stationarity through differencing

Read Section 5.1, “Stationarity through differencing,” on pages 88-92. Know equation 5.1.10 on page 90 and its derivation. Distinguish between σ^2_ε and σ^2_e in this equation.

Read again the last paragraph on page 90 and review Exhibit 5.4 on page 91. Most actuarial time series are not stationary. For your student project, you take first and second differences, and you might also take logarithms. The homework assignment shows how a loss cost trend is made stationary by logarithms and first differences.

Cryer and Chan do not stress changes in the time series over time. The authors know how to judge if the parameters are stable, but they keep the statistics at a first year level.

For the student project, ask yourself whether the time series itself has changed. The module on the interest rate time series on the NEAS web site stresses the three interest rate eras affecting the time series.