ECON 4115/5115

Chapter 4. Time Series Features

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➤ This chapter looks at additional exploratory features of a time series.

➤ The features() function, similar to summary(), is useful to calculate …

  o Means & quantiles
  o Minimum and maximum

➤ The feat_acf() calculates various types of autocorrelation functions, such as …

  o $ACF(j) = \frac{(1/T) \sum_{t=j+1}^{T} (y_t - \bar{y})(y_{t-j} - \bar{y})}{var(y_t)}$ where $-1 \leq ACF(j) \leq 1$ for $j = 0, 1, 2, \ldots$

  o Sum of first 10 autocorrelations (i.e., ACFs)
  o Autocorrelations for differenced and seasonal differenced data

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➢ Features of STL decompositions

- ○ Recall, for the additive decomposition: $y_t = T_t + S_t + R_t$
- ○ The feat_stl() function will calculate useful measures such as ....
  - ▪ $F_T = max\left(0,1 - \frac{var(R_t)}{Var(T_t + R_t)}\right)$
  - ▪ $F_S = max\left(0,1 - \frac{var(R_t)}{Var(S_t + R_t)}\right)$
  - ▪ Spikiness, linearity, and curvature measures

➢ The "feasts" package will calculate a vector of other useful time series features (e.g., …

- ○ bp_stat & lb_stat (white noise statistic)
- ○ partial autocorrelations
- ○ n_crossing_points and n_flat_spots

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