

1. Basic models like WN, RW, and moving average of WN.
2. Stationarity. Strict and second order.
3. Autocovariance $\gamma(s,t) = \text{cov}(X_s, X_t) = E[(X_s - \mu_s)(X_t - \mu_t)]$.
If X is stationary, then $\gamma(h) = \text{cov}(X_t, X_{t+h})$.
4. Autocovariance of WN, moving average of WN. and RW.
5. Autocorrelation function, acf, $\rho(s,t) = \text{cor}(X_s, X_t)$.
If X is stationary, then $\rho(h) = \gamma(h) / \gamma(0)$.
6. cross covariance and cross correlation function.
7. Properties of autocovariance and autocorrelation function for stationary X_t .
 $\gamma(0) = \text{Var}(X_t)$.
 $|\gamma(h)| \leq \gamma(0)$.
 $\gamma(h) = \gamma(-h)$.
8. Linear process. p25.
9. Sample autocovariance and sample acf, p27.
10. SE for sample acf for WN is asymptotically $\sim 1/\sqrt{n}$, p28.
11. Sample cross covariance and sample cross correlation function, p30.
12. Interpreting the sample acf and sample cross correlation, p31.

Chapter 2.

1. Estimating a linear trend.
2. AIC and BIC, pp51-52.
3. Residuals from linear trend, p57.
4. First differences, ∇ , p58.
5. Backshift, B . p58.
6. ∇^d , B^d .
7. log transformation.
8. Periodic components, p66.
9. MA smoother, p67.
10. Kernel smoothing, p68.
11. Lowess and smoothing splines, pp. 69-70.

Chapter 3.

1. AR(p) models, p78.
2. The AR operator, ϕ , p79.
3. The ACF of an AR(1), p80.
4. χ weights, p82-83, 95.
5. MA(q) models, p83.
6. MA operator, p83.
7. ARMA(p,q) models, p85.
8. Reduced form, causality, and invertibility, pp 86-88, 97.
9. π weights.
10. PACF, p99-100.
11. ACF and PACF of ARMAs, p101.
12. Prediction for ARMAs, p105.
13. Yule-Walker estimates, p115-116.
14. Method of moment estimates, MLE and least squares estimates.
15. Overfitting as a tool, p129.
16. Bootstrapping ARMAs, pp 130-132.
17. Differencing and ARIMAs, pp 133-134.
18. Q statistic, p141.

Chapter 4.

1. Spectral density.
2. Amplitude, frequency, period, etc.
3. Periodogram.
4. Estimation via Daniell windowing, or by smoothing autocovariances.
5. Parametric spectral density estimation.
6. Linear filters.
7. Impulse response and frequency response functions.

Chapter 5.

1. Fractional differencing models, pp 267-272.
2. Unit root testing, the null and alternative hypotheses, DF test, ADF test, p277.
3. Brownian Motion, p278.
4. ARCH models, pp 281-283, and GARCH p285.