

Solutions to Tutorial 9

1. (a) (145)

(b) (0)–0.9596; (4)–0.7338; (45)–(–0.1927); (145)–(–4.6600)

The model calculated: (0), (1), (2), (3), (4), (5), (14), (24), (34), (45), (145), (245), (345), (1245), (1345).

(c) (12345)–(–4.5600), (1345)–(–4.6157), (145)–(–4.6600)

The model calculated: (12345), (2345), (1345), (1245), (1235), (1234), (345), (145), (135), (134), (45), (15), (14).

(d)

$$SSE(F) = 0.2406 \quad df = 34,$$

$$SSE(R) = 0.2618 \quad df = 46,$$

$$F = \frac{(0.2618 - 0.2406)/2}{0.2406/34} = 1.4979 < F(0.95, 2, 34) = 3.3158$$

Thus, they can be removed.

2. see **R-code**

3. (a) $s(b_0) = 0.8229$ and $s(b_1) = 0.2634$

(b) $DW = 0.9737425 < D_U = 1.15$ and $> d_L = 0.95$ no conclusion

(d) $H_0 : \rho = 0, H_a : \rho > 0. DW = 1.76, d_L = 0.93, d_U = 1.13$. If $DW > 1.13$ conclude H_0 , if $DW < 0.93$ conclude H_a , otherwise the test is inconclusive. Conclude H_0

(e) $\hat{Y} = 94.8720 + 50.5470X$ with $s(b_0) = 0.8370$ and $s(b_1) = 0.2622$

(c) $r = 0.3319, b'_0 = 63.3840, b'_1 = 50.5470$ and

$$\hat{Y}' = 63.3840 + 50.5470X'$$

with $s(b'_0) = 0.5592, s(b'_1) = 0.2622$

(f) $t(0.995; 17) = 2.898, 50.5470 \pm 2 : 898 * (0.2622)$, i.e. $49.787 \leq \beta_1 \leq 51.307$

(g) $\hat{Y} = 94.8720 + 50.5470 * 4.625$

4. Let $\tilde{Y}_t = Y_t - \rho_1 Y_{t-1} - \rho_2 Y_{t-2}$ and $\tilde{X}_t = X_t - \rho_1 X_{t-1} - \rho_2 X_{t-2}$. Then

$$\tilde{Y}_t = \beta_0(1 - \rho_1 - \rho_2) + \beta_1 \tilde{X}_t + \{\varepsilon_t - \rho_1 \varepsilon_{t-1} - \rho_2 \varepsilon_{t-2}\}$$

i.e.

$$\tilde{Y}_t = \beta'_0 + \beta_1 \tilde{X}_t + u_i$$