Rewrite Exam 1, question 11: One has fit a regression model with 6 variables (5 independent variables plus the intercept), to 18 observations.

One is testing the hypothesis H_0: $\beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$,

versus the alternative hypothesis that H_0 is false.

TSS is the total sum of squares.

RSS is the residual (error) sum of squares.

What is the critical region for a test at a 1% significance level?

A. TSS ≥ 3.1 RSS
B. TSS ≥ 3.2 RSS
C. TSS ≥ 3.3 RSS
D. TSS ≥ 3.4 RSS
E. TSS ≥ 3.5 RSS

Solution to the revised question at the end of the errata.

Exam 1, solution 9: $\text{Var}[\hat{\beta}_0] = \mathbf{0.0431}$. Final answer is okay.

Exam 2, question 18: the **r**th value from smallest to largest is:

Exam 2, solution 38: The final balance equation should be: $0.1\pi_1 + \mathbf{0.2}\pi_2 + 0.5\pi_3 = \pi_3$.

The final solution is okay.

Exam 2, solution 42: $14S_1^2/\sigma_1^2$ is Chi-Square with 14 degrees of freedom.

Exam 3, solution 1: those with x values closest to $\mathbf{x_0}$ get more weight

Exam 3, solution 15: $(y_t - y_{t-1}) = 0.3\,(y_{\mathbf{t-1}} - y_{\mathbf{t-2}}) - 0.5\,(y_{\mathbf{t-2}} - y_{\mathbf{t-3}}) + w_t + 0.4\,w_{t-1} + 0.2\,w_{t-2}$.

Final answer is okay.

Exam 4, solution 11: The smoothed density at **70** is:

Exam 4, solution 35: The main limitation of GAMs is that the model is restricted to be additive.

However, we can add interaction terms by including additional predictors such as $X_j X_k$.

In addition we could add low-dimensional interaction functions of the form $f_{jk}(X_j, X_k)$ into the model.

Thus while "GAMs allow one to include interaction terms." is not a listed advantage of GAMs, the question would be much better without the given choice D.

I will change the question to:

D. The smoothness of each function on a predictor can be summarized via degrees of freedom.
E. All of the above are advantages of GAMs.

Exam 6, Q. 24: You are given a sample of size **four**: 11, 12, 12, 16.

Exam 6, sol. 28-30: In the table the total degrees of freedom should be **(3)(4)(2) = 24**

Exam 6, sol. 37: Final answer is okay.

The squared error is: $\sum(y_i - \beta_0 - \beta_1 x_i - \beta_2 x_i^2)^2$.

$$0 = \frac{\partial \text{ squared error}}{\partial \beta_0} = \sum -2\,(y_i - \beta_0 - \beta_1 x_i - \beta_2 x_i^2).$$

$$0 = \frac{\partial \text{ squared error}}{\partial \beta_1} = \sum -2\,x_i\,(y_i - \beta_0 - \beta_1 x_i - \beta_2 x_i^2).$$

$$0 = \frac{\partial \text{ squared error}}{\partial \beta_2} = \sum -2\,x_i^2\,(y_i - \beta_0 - \beta_1 x_i - \beta_2 x_i^2)\ .$$

Exam 7, sol. 35, in the Comment: if each component follows an **Exponential distribution**

Exam 8, Q. 36

A. $x_t = w_t - 0.8w_{t-1} + 0.6w_{t-2}$ and $y_t = 0.8\mathbf{y}_{t-1} + w_t$

B. $x_t = w_t - 0.8w_{t-1} + 0.6w_{t-2}$ and $y_t = -0.8\mathbf{y}_{t-1} + w_t$

C. $x_t = w_t - 0.8w_{t-1} + 0.6w_{t-2} - 0.4w_{t-3}$ and $y_t = 0.8\mathbf{y}_{t-1} + w_t$

D. $x_t = w_t - 0.8w_{t-1} + 0.6w_{t-2} - 0.4w_{t-3}$ and $y_t = -0.8\mathbf{y}_{t-1} + w_t$

Exam 8, sol. 12, next to last line: ${}_3\mathbf{p}_{70}$ Final solution is okay.

Exam #9, sol. 7: $\theta = 1/\lambda = \mathbf{1/(1/2)} = 2$.

Exam #9, sol. 26: 1 + 5 + 4 + 3 + 2 + 1 = **16** models. Statement III is false.

Exam #12, sol. 21: Applying this with k = -3 and τ = 3: $E[1/X^{\mathbf{3}}] = \theta^{-3}\,\Gamma[1 - (-3)/3]$

Exam #13, sol. 24: Prob[category is j or less] = $\dfrac{\exp[\beta_{0j} + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3]}{1 + \exp[\beta_{0j} + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3]}$.

Final solution is okay.

Solution to rewritten Exam 1, question 11:

11. A. Compute F-Statistic = $\frac{\text{(TSS - RSS) / (k-1)}}{\text{RSS / (N - k)}} = \frac{\text{(TSS - RSS) / (6-1)}}{\text{RSS / (18 - 6)}}$

= 2.4 (TSS - RSS) / RSS.

F has k - 1 = 5, and N - 5 = 12 degrees of freedom, and the 1% critical value is 5.06.

Critical region is when we reject H_0, which is when F ≥ 5.06. ⇒

2.4 (TSS - RSS) / RSS ≥ 5.06. ⇒ **TSS ≥ 3.11 RSS**.