Errata for ACTEX Study Manual
for CAS Exam S
(Spring 2016 Edition)

February 26, 2016

- **February 26, 2016:** Here is the solution to Example 3.1.4 on page 173.

  Solution. For interest rates to decrease from year 2003 to 2004, there are only two possible events:

  1. Interest rates decrease from year 2002 to 2003, and further decrease from year 2003 to 2004. The probability is

  $$(1 - 0.20)^2 = 0.64.$$

  2. Interest rates increase from year 2002 to 2003, then decrease from year 2003 to 2004. The probability is

  $$(0.20)(1 - 0.25) = 0.15.$$

  The total probability is $0.64 + 0.15 = \boxed{0.79}$. (**Answer: B**) □

- **February 25, 2016:** Problem 10.7.4 and its solutions on pages 793 and 794 should be amended as follows:

  Problem 10.7.4. (Predicted mean using the canonical link) A GLM is used to model claim size. You are given the following information about the model:

  ▷ Claim size follows a Gamma distribution.

  ▷ The canonical link function is used.

  ▷ Model output:

Variable	$\hat{\beta}$
Intercept	10.52
Age	−0.12
Gender - Female	
Gender - Male	−2.63

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Calculate the estimated mean claim size for a 30-year-old female.

A. Less than 0.1

B. At least 0.1, but less than 0.2

C. At least 0.2, but less than 0.3

D. At least 0.3, but less than 0.4

E. At least 0.4

Ambrose's comments: This question challenges you by not directly telling you the link function used – you need to find (or recall, if you can remember) the canonical link function first!

Solution. The canonical link function for the gamma distribution is the inverse link, $g(\mu) = 1/\mu$ (see also Problem 11.3.8). The explanatory variables corresponding to a 30-year-old female are $x_0 = 1$ (intercept), $x_1 = 30$ (30-year old) and $x_2 = 0$ (female). The linked mean is estimated to be

$$\hat{\mu} = 10.52(1) - 0.12(30) - 2.63(0) = 6.92.$$

With the inverse link, the estimated mean claim size is the inverse of the linked mean, or

$$1/6.92 = \boxed{0.1445}. \quad \textbf{(Answer: B)}$$

$\square$

- **January 23, 2016:** In the solution of Problem 1.4.12 on page 107, the wind claims that are covered by the reinsurance contract form a Poisson process with a rate of $2\mathrm{e}^{-\boxed{250,000/200,000}} = 2\mathrm{e}^{-1.25}$ per year. The final answer is

$$\mathrm{Var}[N(1)] = 700\mathrm{e}^{-50/7} + 2\mathrm{e}^{-1.25} = \boxed{1.1264}. \quad \textbf{(Answer: E)}$$