ECON 4130
2004 H

Exercises for the last lecture

Rice ex. 2.67

Rice ex. 4.55

Rice ex. 8.14 (a-c)

[**Hints:** Note that if $g(x)$ is an integrable function that is symmetric about origo, i.e. $g(-x) = -g(x)$, then $\int_{-\infty}^{\infty} g(x)dx = 0$. Hence $\mathrm{E}(X) = 0$. You will also need $\mathrm{E}\,|X|$ and $\mathrm{E}\left(X^2\right)$. Note that if $h(x)$ is symmetric about the Y-axis, then $\int_{-\infty}^{\infty} h(x)dx = 2\int_{0}^{\infty} h(x)dx$. Hence, for example,

$\mathrm{E}\,|X| = \int_{-\infty}^{\infty} \frac{1}{2\sigma}|x| e^{-\frac{1}{\sigma}|x|}dx = 2\int_{0}^{\infty} \frac{1}{2\sigma} x e^{-\frac{1}{\sigma}x}dx$ etc., and use the exponential distribution.]

Rice ex. 8.51

[**Hint for a.** If A denotes the event that two twins are identical, then, from the text, $P(MM \mid A) = 1/2$ and $P(MM \mid \bar{A}) = 1/4$. Hence $P(MM) = P(MM \mid A)P(A) + P(MM \mid \bar{A})P(\bar{A})$ etc. **Hint for b:** Note that (n_1, n_2, n_3) must be multinomial with $n = n_1 + n_2 + n_3$ trials. Note also that $n_1 + n_2$ must be binomially distributed (why?)]

Rice ex. 9.35

[**Hint:** Assume that the frequencies in the table are multinomial with 13 cells and cell probabilities, $p_0, p_1, p_2, \ldots, p_{12}$. Under H_0 these are binomial probabilities. To calculate binomial (bin(12,q)-probabilities in stata, use the function Binomial(12,x,q) that calculates $P(X \geq x)$. Hence, if the numbers, 0,1,2,….,12 are collected in the column z, the probabilities $P(X = x)$ can be generated by the command: gen r = Binomial(12,z,q) − Binomial(12,z+1,q), where q is the success-probability.]