Assignments #04 of
Econometrics I & Advanced Econometrics I (2013SY)

May 15, 2013
May 21, 2013 (corrected)

Instruction to students

1. **Dead line for submission: 17:00 of May 24, 2013. Please submit your answer to the Office of the Education Affairs.**
2. Use A4 size papers to answer.
3. The answer may be written in Japanese as well as English.

Q1

Suppose X and Y are **mutually independent** random variables and that their probability densities are given by

$$f(x) = \frac{x}{4}e^{-x/2} \;\; x > 0, \qquad g(y) = 2e^{-2y} \;\; y > 0.$$

respectively. In this situation, answer following questions.

(1) Find the probability density function of $W = \log_e Y$.

(2) Find the probability density function of $V = X^3$.

(3) Let be $Z = X/Y$ and $U = X + Y$. Find $h(u|z)$, the conditional probability density function of U given $Z = z$.

Q2

Suppose that X_1 and X_2 are random variables and their joint probability function is given in the table below. In this situation, answer following questions.

(1) Find the joint probability function of $Y = X_2^2 - X_1^2$ and $Z = X_2^2 + X_1^2$.

(2) Find the marginal distribution function of Y.

(3) Find the marginal probability function of Z.

		X_1		
		1	$\sqrt{2}$	$\sqrt{5}$
X_2	$\sqrt{3}$	0.15	0.10	0.05
	4	0.15	0.10	0.20
	$\sqrt{6}$	0.06	0.10	0.09