School of Mathematics(SOM)

Thapar Institute of Engineering and Technology (TIET)

Probability and Statistics (UCS410)

Exp. sheet 06 (Joint probability mass and density functions)

(1) The joint probability density of two random variables X and Y is

$$f(x,y) = \begin{cases} 2(2x+3y)/5; & 0 \le x, y \le 1 \\ 0; & elsewhere \end{cases}$$

Then write a R-code to

- (i) check that it is a joint density function or not? (Use integral2())
- (ii) find marginal distribution g(x) at x = 1.
- (iii) find the marginal distribution h(y) at y = 0.
- (iv) find the expected value of g(x, y) = xy.
- (2) The joint probability mass function of two random variables X and Y is

$$f(x,y) = \{(x+y)/30; x = 0,1,2,3; y = 0,1,2\}$$

Then write a R-code to

- (i) display the joint mass function in rectangular (matrix) form.
- (ii) check that it is joint mass function or not? (use: Sum())
- (iii) find the marginal distribution g(x) for x = 0, 1, 2, 3. (Use:apply())
- (iv) find the marginal distribution h(y) for y = 0, 1, 2. (Use:apply())
- (v) find the conditional probability at x = 0 given y = 1.
- (vi) find E(x), E(y), E(xy), Var(x), Var(y), Cov(x,y) and its correlation coefficient.