

BIVARIATE TRANSFORMATIONS

Random variables X_1 and X_2 have joint density $f(x_1, x_2)$ and $Y = g(X_1, X_2)$. What is the density of Y ?

cdf method:

- (a) Identify the possible values of Y .
- (b) For a fixed value y , sketch $Y = y$ in the $x_1 x_2$ -plane.
- (c) Find the region R in the $x_1 x_2$ -plane where $Y \leq y$.
- (d) Find the cdf $F_Y(y)$ by integrating $f(x_1, x_2)$ over R .
- (e) Differentiate F_Y to obtain the density $f_Y(y)$.