Handout 18: Change of Variables

Today we introduce a formula for deriving the densities of some of the final distributions on our reference sheet. Consider a differentiable function $g : \mathbb{R} \to \mathbb{R}$ that has a continuous inverse g^{-1}. Take a random variable X and define $Y = g(X)$. Then, we can express the probability density function the variable Y as follows:

$$f_Y(y) = f_X[g^{-1}(y)] \cdot \left| \frac{d}{dy} g^{-1}(y) \right|$$

This is called the one-dimensional change of variables formula, a powerful tool for deriving the density functions of random variables.