9231 CAIE Further Maths Stats — CRV

Alston

1 Basic Stuff

To get to the CDF, you would integrate the PDF.

2 Calculating Expected Value for a CRV

Theorem 2.1

$$E(X) = \int_{\forall x} xf(x)dx$$

$$E(g(X)) = \int_{\forall x} g(x)f(x)dx$$

This is just the occurance $\times$ the probability of occuring.

3 Changing Variables

To go from one PDF to another, you must go through the route that is the CDF.

Theorem 3.1

$$f(x) \implies F(Y) \implies G(Y) \implies g(y)$$

In other words, we have

$$P(Y \leq y) = P(H(X) \leq y) = P(X \leq H^{-1}(y))$$

So we just need to undo the function that is applied to the X. Special care needs to be taken when handling domains. If we have $a \leq x \leq b$, then we would have $a \leq H^{-1}(y) \leq b$. Then you undo.