

$$E[h(x) | Y] = \int h(x) f_{x|Y}(x|Y) dx.$$

$$Y, \quad Z = f(X)$$

$$E[\text{~~z~~ | } f(X) = 0] \quad Z = f(X)$$

$$= E[f(X)]$$

$$\int y P_{Y|Z}(y|z) dz \cdot dy$$

$$= \int y \frac{P_{Y,Z}(y,z)}{P_Z(z)} dy$$

$$P_{Y,Z}(y,z) = \int_{\Theta(z)} P_{X,Y}(x(\theta,z), y) |J| d\theta.$$

$$P_Z(z) \propto \int y \int_{\Theta(z)} P_{X,Y}(x(\theta,z), y) |J| d\theta \cdot dy$$

$$P_Z(z)$$