For rvs X, Y, Z, A and an event A.

$\leftrightarrow$ Let $Z \sim X|A$

$(\Omega,$

$A \in \mathcal{F}$

$X: \Omega \to \mathbb{R}$

$\{B \cap A: B \in \mathcal{F}\}$ is a sigma alg itself.

$X|A: \Omega \cap A \to \mathbb{R}$ for a msble event A.

Y is $\mathcal{G}$-msble, Y is msble

$$E[Z \mathbb{1}_{[B]}] = E[Z' \mathbb{1}_{[B]}] \quad \text{for } B \in \sigma(Y)$$

$\boxed{Z \sim X|A}$

$$E\left[Z \mathbb{1}_{[B]} \right] = E\left[\frac{E[X \mathbb{1}_{[A]} | Y]}{P(A)} \mathbb{1}_{[B]} \right]$$

$E[(X|A) \mathbb{1}_{[B]}] = E[X \mathbb{1}_{[B]} | A]$

$\|$

$$= E\left[\frac{X \mathbb{1}_{[A]} \mathbb{1}_{[B]}}{P(A)} \right]$$

$\boxed{\mu_A = \dfrac{\mu(B \cap A)}{\mu(A)}}$

$E_A[X] A) =$