

$$\text{Var}(y|x=1) =$$

$$(0 - E(y|x=1))^2 P(y=0|x=1) + \\ (1 - E(y|x=1))^2 P(y=1|x=1) + \\ (2 - E(y|x=1))^2 P(y=2|x=1).$$

$$22 - U = aXV = bY + W = cZ$$

$$\text{Var}(U+V+W) = E(U+V+W - [\mu_U + \mu_V + \mu_W])^2$$

$$E((U - \mu_U) + (V - \mu_V) + (W - \mu_W))^2 =$$

$$E(U - \mu_U)^2 + E(V - \mu_V)^2 + E(W - \mu_W)^2 \\ + 2E(U - \mu_U)(V - \mu_V) + \\ 2E(U - \mu_U)(W - \mu_W) +$$

$$2E(V - \mu_V)(W - \mu_W) =$$

$$\sigma_U^2 + \sigma_V^2 + \sigma_W^2 + 2\sigma_{UV} + 2\sigma_{UW} +$$

$$2\sigma_{VW}. \text{ On substituting enonite}$$

$$\text{Var}(U) = \text{Var}(aX), \text{Var}(V) = \text{Var}(bY), \text{Var}(W) =$$

$$\text{Var}(cZ), \sigma_{UV} = \text{Cov}(aX, bY), \sigma_{UW} = \text{Cov}(aX, cZ), \\ \sigma_{VW} = \text{Cov}(bY, cZ)$$