1 Itô integral (I)

$$E\left[\sum_{i=1}^{n} X_{t_{i-1}}\Delta W_{t_{i-1}} \cdot \sum_{i=1}^{n} Y_{t_{i-1}}\Delta W_{t_{i-1}}\right] = \sum_{i=1}^{n} E\Big[X_{t_{i-1}}Y_{t_{i-1}}\Delta W_{t_{i-1}}^2\Big]$$

$$= \sum_{i=1}^{n} E\Big[X_{t_{i-1}}Y_{t_{i-1}}E[\Delta W_{t_{i-1}}^2|\mathcal{F}_t]\Big] = \sum_{i=1}^{n} E\Big[X_{t_{i-1}}Y_{t_{i-1}}\Delta t\Big]$$

2 Itô integral (II)

$$Var\left(\int_0^t X_s dWs\right) = E\left[\left(\int_0^t X_s dW_s\right)^2\right] = E\left[\int_0^t X_S dW_s \cdot \int_0^t X_S dW_s\right]$$

$$= \int_0^t E\Big(X_s^2 dW_s^2\Big) = \int_0^t E\left[X_s^2 E\Big(dW_s^2 | \mathcal{F}_s\Big)\right] = \int_0^t E\Big(X_s^2\Big) dS = X_t^2$$