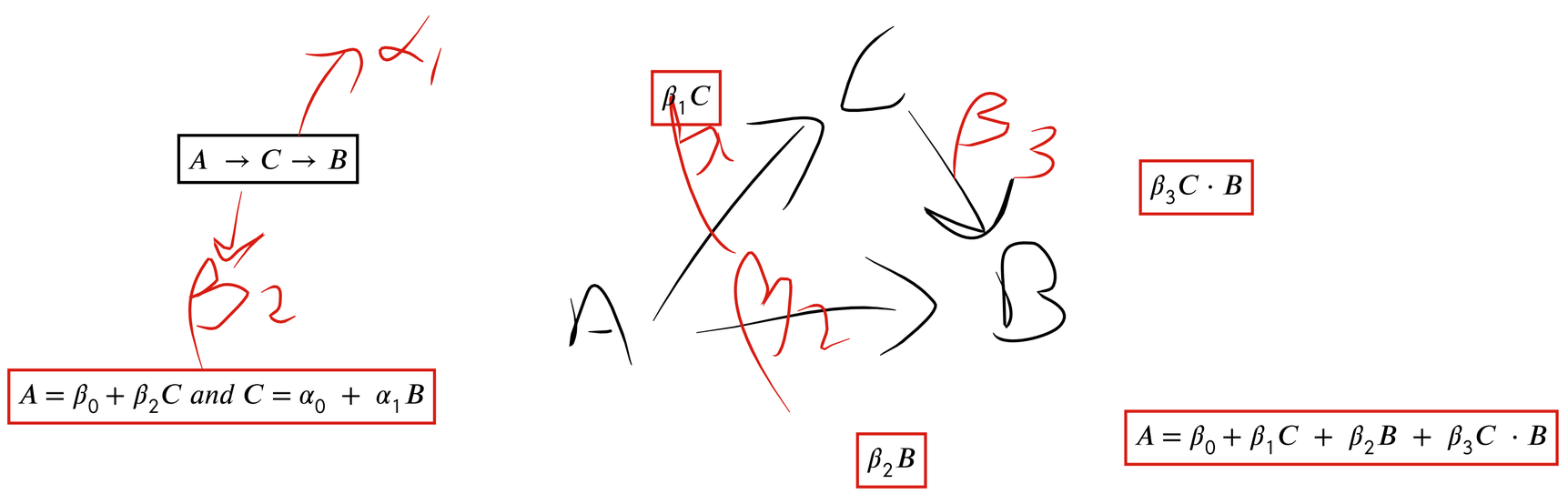
$$Standardising: \frac{x_i - \bar{x}}{sd_x}$$
$$Centering: x_i - \bar{x}$$

$$\begin{aligned} sales_i &= 869.693 + 9.871\ int_i + 41.4\ ext_i + 0.276\ int_i \cdot ext_i \\ &= \left(869.693 + 41.4\ ext_i\right) + \left(9.871 + 0.276\ ext_i\right) int_i \\ &= \left(869.693 + 9.871\ int_i\right) + \left(41.4 + 0.276\ int_i\right) ext_i \end{aligned}$$



$$Total\ SS: \sum_i \left(y_i - \bar{y}\right)^2 = Error\ SS + Reg\ SS$$

$$Error\ or\ Residual\ SS: \sum_i \left(\left(y_i - \bar{y}\right) - \left(\hat{y}_i - \bar{y}\right)\right)^2 = \sum_i \left(y_i - \hat{y}_i\right)^2$$

$$Regression\ SS: \sum_i \left(\hat{y}_i - \bar{y}\right)^2$$

$$\begin{aligned} df_{total} &= df_{between} + df_{error} \\ n - 1 &= (G - 1) + (n - G) \end{aligned}$$

homoskedasticity = homogeneity of variance

$$Y_i = \beta_0 + \beta_1 X_1 + \ldots + \beta_p X_p + \varepsilon_i \sim N\left(\mu, \sigma^2\right)$$
$$i = 1, \ldots, n$$
$$Cor\left(\varepsilon_i, \varepsilon_j\right) = 0\ uncorrelated\ serial\ error\ terms$$
$$Cor\left(\varepsilon_i, \varepsilon_i\right) = Var(\varepsilon_i) = \sigma^2\ all\ have\ the\ same\ variance = homoskedasticity$$
$$\varepsilon_i \sim N\left(0, \sigma^2\right)\ for\ all\ i = 1, \ldots, n$$

$One - way\ ANOVA:$ *measures the ratio between between group variance to the within group variance*

$$F = \frac{MS_{between}}{MS_{within}}$$
$$\hat{y} = \bar{y}_4 + \left(\bar{y}_1 - \bar{y}_4\right)D_1 + \left(\bar{y}_2 - \bar{y}_4\right)D_2 + \left(\bar{y}_3 - \bar{y}_4\right)D_3$$