

Pearson Korrelationskoeffizient

$$r_{xy} = \frac{1/n \sum_1^n (x_i - \bar{x}) \cdot (y_i - \bar{y})}{s_x \cdot s_y} = \frac{s_{xy}}{s_x \cdot s_y}$$

CO2	Year
792.793	2014
795.940	2015
801.655	2016
797.966	2017
759.002	2018

Mittelwert

$$\bar{x} = \frac{792.793 + 795.940 + 801.655 + 797.966 + 759.002}{5} = \frac{3946.856}{5} = 789.2712$$

$$\bar{y} = \frac{2014 + 2015 + 2016 + 2017 + 2018}{5} = \frac{10080}{5} = 2016$$

Standardabweichung

$$s_x = \sqrt{\frac{1}{n} \sum_1^n (x_i - \bar{x})^2} \quad s_y = \sqrt{\frac{1}{n} \sum_1^n (y_i - \bar{y})^2}$$

$$s_x = \sqrt{\frac{(792.793 - \bar{x})^2 + (795.940 - \bar{x})^2 + (801.655 - \bar{x})^2 + (797.966 - \bar{x})^2 + (759.002 - \bar{x})^2}{5}}$$

$$= \sqrt{\frac{1066.804}{5}} \approx 14.6013$$

$$s_y = \sqrt{\frac{(2014 - \bar{y})^2 + (2015 - \bar{y})^2 + (2016 - \bar{y})^2 + (2017 - \bar{y})^2 + (2018 - \bar{y})^2}{5}}$$

$$= \sqrt{\frac{4 + 1 + 0 + 1 + 4}{5}} = \sqrt{\frac{10}{5}} \approx 1.4142$$

$$r_{xy} = \frac{1/n \sum_1^n (x_i - \bar{x}) \cdot (y_i - \bar{y})}{s_x \cdot s_y}$$

$$= \frac{1}{5} \cdot \frac{\sum_1^n (x_i - \bar{x}) (y_i - \bar{y})}{14.6013 \cdot 1.4142}$$

$$= \frac{1}{5} \cdot \frac{-70.8596}{20.6491} = \frac{-70.8596}{103.2455} \approx -0.6863$$

⇒ Korrelationskoeffizient etwa -0.6863