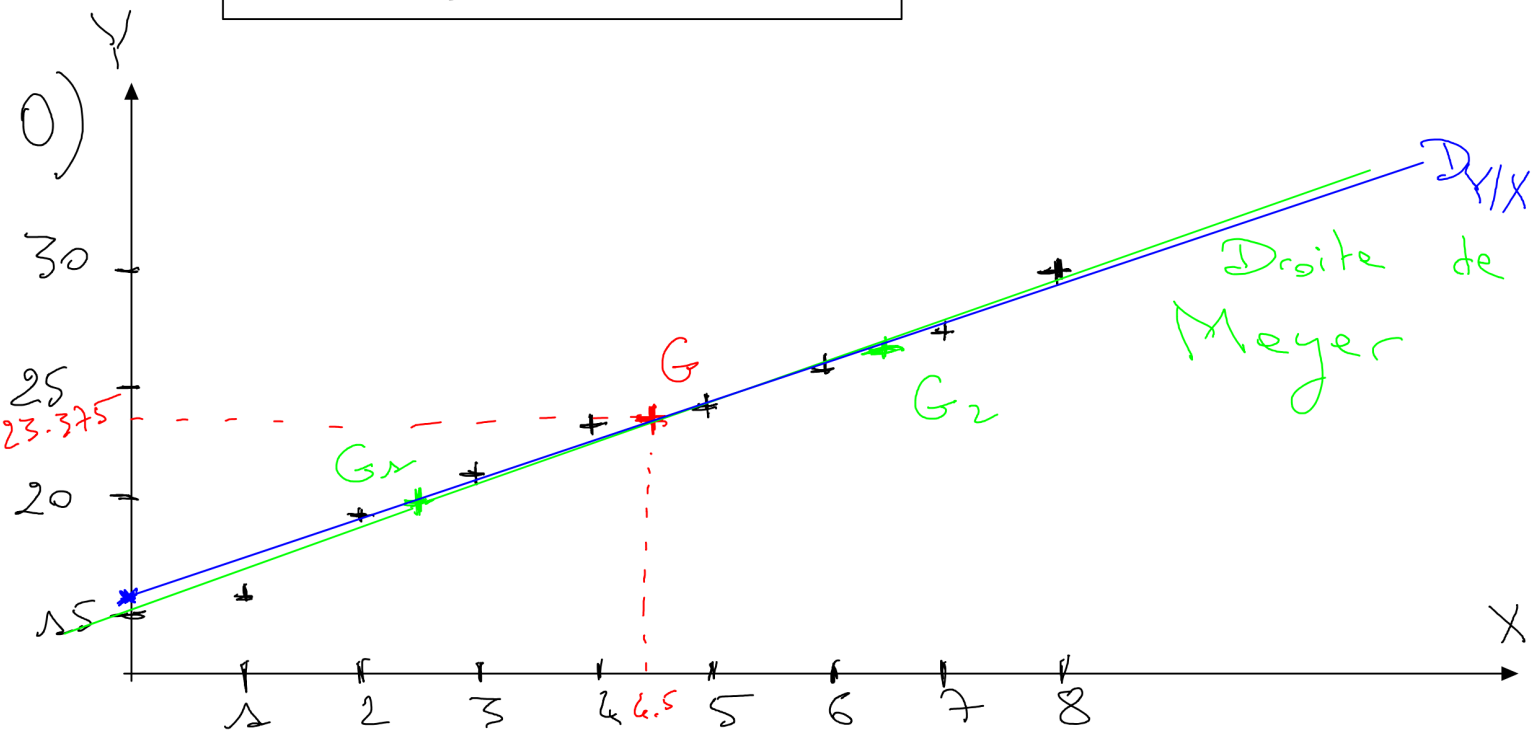


TD 2 , Exercice 1



$$G = (m(X), m(Y)) = (4.5, 23.375)$$

$$1) G_1 = (x_1, y_1) = (2.5, 20)$$

$$G_2 = (x_2, y_2) = (6.5, 26.75)$$

$$a = \frac{y_2 - y_1}{x_2 - x_1} = 1.687$$

Equation de la droite de Meyer:

$$Y = 1.687(X - 2.5) + 20$$

$$2) G_V(X, Y) = m(XY) - m(X)m(Y)$$

$$= \frac{1}{n} \sum_{i=1}^8 x_i y_i - m(X)m(Y)$$

$$= \frac{1}{8} 917 - 4.5 \times 23.375$$

$$= 9.4375$$

$$3) \underline{\underline{D_{Y|X}}} : Y = aX + b$$

$$a = \frac{\text{Cov}(X, Y)}{V(X)} = 1.798$$

$$b = m(Y) - a \cdot m(X) = 23.375 - 1.798 \times 4.5 \\ = 15.286 \rightarrow \text{ou}$$

$$Y = 1.798 \times X + 15.286$$

$$\begin{array}{r} 15.2857 \\ 15.286 \end{array}$$

G appartient à $D_{Y|X}$

par $X=0$ on a $Y=15.286$.

Vérification: \rightarrow utiliser LinReg($aX + b$) (TEXAS)
utiliser \rightarrow utiliser

Droite de régression $D_{X|Y}$

$$\hat{a} = \frac{\text{Cov}(X, Y)}{V(Y)} = 0.540$$

$$\hat{b} = m(X) - \hat{a} \cdot m(Y) = 4.5 - 0.540 \times 23.375 \\ = -8.117$$

$$D_{X|Y} : X = 0.540 \times Y - 8.117$$

Prévoir le chiffre d'affaire pour la 10^{ème} année.

(*) Droite de Mayer:

$$1.687 \times (10 - 2.5) + 20 = 32.652 \text{ M€}$$

⊗ Droite $D_{Y|X}$

$$1.798 \times 10 + 15.286 = 33.266 \text{ M€}$$

5) Coefficient $r(X, Y)$ de Pearson:

$$r(X, Y) = \frac{\text{cov}(X, Y)}{s(X) \cdot s(Y)} = \frac{9.4375}{2.291 \times 4.181}$$
$$= 0.985 \approx 1$$

Forte relation linéaire entre X et Y.

Vérification: over LinReg: TEXAS

REG, X : CASIO