

$$1/ CT = q^2 + 50q \Rightarrow C_{mg} = 2q + 50$$

$$Q = 300 - 2P \Rightarrow 2P = 300 - Q$$

$$\Rightarrow P = 150 - 0,5q$$

$$\Rightarrow RT = 150 - 0,5q$$

$$\Rightarrow KT = 150P - 0,5q^2$$

$$R_m = C_{mg} \Rightarrow 2q + 50 = 150 - q$$

$$\Rightarrow 3q = 100 \Rightarrow q = 33,33$$

$$P = 150 - 0,5(33,33) = 133,33$$

$$\pi = (133,33 \times 33,33) - [33,33^2 + 50(33,33)]$$

$$= 4443,88 - 2677,39 = 1666,49$$

$$2/ P = C_{mg}$$

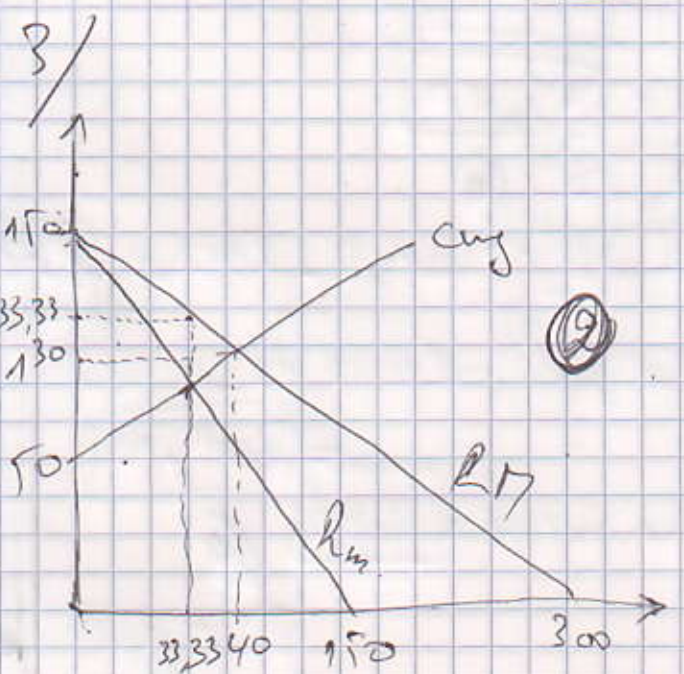
$$\Rightarrow 150 - 0,5q = 2q + 50$$

$$\Rightarrow 2,5q = 100 \Rightarrow q = 40$$

$$P = 150 - 0,5(40) = 130$$

$$\pi = 130(40) - [40^2 + 50(40)]$$

$$= 5200 - 3600 = 1600$$



$$4/ SS^{ctaw} = \frac{20 \times 40}{2} = 400$$

$$SS \text{ (concurrance)} = \pi + SS^e$$

$$= 1600 + 400 = 2000$$

$$SS^c \text{ (Monopole)} = \frac{16,67 \times 33,33}{2}$$

$$= 277,80$$

$$SS \text{ (Monopole)} = \pi + SS^c$$

$$= 1666,49 + 277,8 = 1944,29$$

$$\text{Charge morte} = 2000 - 1944,29$$

$$= 55,71$$

5/ On determine d'abord l'equation de reaction de l'q.

$$\text{Qua: } CT = q_1^2 + 70q_2$$

$$\pi_2 = P \cdot q_2 - CT_2$$

$$\pi_2 = 150 - 0,5(q_1 + q_2)q_2 - q_2^2 - 70q_2$$

$$= 150q_2 - 0,5q_1q_2 - 0,5q_2^2 - q_2^2 - 70q_2$$

$$= -1,5q_2^2 - 0,5q_1q_2 + 80q_2$$

$$\frac{\partial \pi_2}{\partial q_2} = 0 \Rightarrow -3q_2 - 0,5q_1 + 80 = 0$$

$$\Rightarrow q_2 = 26,66 - 0,16q_1$$

$$\pi_1 = 150 - 0,5(q_1 + 26,66 - 0,16q_1)q_1 - q_1^2 - 50q_1$$

$$= 150q_1 - 0,5q_1^2 - 13,33q_1 + 0,08q_1^2 - q_1^2 - 50q_1$$

$$= -1,42q_1^2 + 86,67q_1$$

$$\frac{\partial \pi_1}{\partial q_1} = 0 \Rightarrow -2,84q_1 + 86,67 = 0$$

$$\Rightarrow q_1 = \frac{86,67}{2,84} = 30,51$$

$$q_2 = 26,66 - 0,16(30,51) = \boxed{21,78} \quad \textcircled{1}$$

$$P = 150 - 0,1(30,51 + 21,78) = 150 - 26,14 = 123,86$$

$$\pi_1 = 123,86(30,51) - [30,51^2 + 50(30,51)] = 3778,96 - 2456,36 = \boxed{1322,6}$$

$$\pi_2 = 123,86(21,78) - [21,78^2 + 70(21,78)] = 2697,67 - 1998,96 = \boxed{698,71} \quad \textcircled{2}$$

$$\begin{aligned} 6/ \quad \pi_9 &= 150 - 0,5(q_1 + q_2)(q_1 + q_2) - (q_1^2 + 50q_1) - (q_2^2 + 70q_2) \\ &= 150q_1 + 150q_2 - 0,5q_1^2 - 0,5q_2^2 - q_1q_2 - q_1^2 - 50q_1 - q_2^2 - 70q_2 \\ &= -1,5q_1^2 - 1,5q_2^2 - q_1q_2 + 100q_1 + 80q_2 \end{aligned}$$

$$\frac{\partial \pi_9}{\partial q_1} = 0 \Rightarrow -3q_1 - q_2 + 100 = 0 \Rightarrow q_1 = 33,33 - 0,33q_2 \quad \textcircled{1}$$

$$\frac{\partial \pi_9}{\partial q_2} = 0 \Rightarrow -3q_2 - q_1 + 80 = 0 \Rightarrow q_2 = 26,66 - 0,33q_1 \quad \textcircled{2}$$

En remplaçant ② dans ①, on obtient:

$$q_1 = 33,33 - 0,33(26,66 - 0,33q_1) \Rightarrow q_1 = 33,33 - 8,88 + 0,11q_1$$

$$\Rightarrow 0,89q_1 = 24,45 \Rightarrow \boxed{q_1 = 27,47} \quad \textcircled{1}$$

$$q_2 = 26,66 - 0,33(27,47) = \boxed{17,59} \quad \textcircled{2}$$

$$q = q_1 + q_2 = 27,47 + 17,59 = \boxed{45,06}$$

$$P = 150 - 0,5(45,06) = \boxed{127,47} \quad \textcircled{1}$$

$$\pi_1 = 127,47(27,47) - [27,47^2 + 50(27,47)] = 3501,6 - 2128,1 = \boxed{1373,5}$$

$$\begin{aligned} \pi_2 &= 127,47(17,59) - [17,59^2 + 70(17,59)] = 2242,19 - 1540,7 \\ &= \boxed{701,48} \end{aligned}$$

$$\pi_9 = \pi_1 + \pi_2 = 1373,5 + 701,48 = \boxed{2075} \quad \textcircled{1}$$

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[Signature]