TD N°4 (CPG)

Solu Exo 1 :

1. $R = 2 \dfrac{t_{rA} - t_{rB}}{l_A + l_B} = 2 \dfrac{(17,63 - 16,40)}{(1,11 + 1,21)} = 1,06 < 1,5$ mauvaise séparation

2. $N_A = 16 \left(\dfrac{t_{rA}}{l_A}\right)^2 = 16 \left(\dfrac{16,40}{1,11}\right)^2 = 3493$ plateaux

$N_B = 16 \left(\dfrac{t_{rB}}{l_B}\right)^2 = 16 \left(\dfrac{17,63}{1,21}\right)^2 = 3397$ plateaux

$N_{moy} = \dfrac{N_A + N_B}{2} = \dfrac{3493 + 3397}{2} = 3445$ plateaux

$H = ?$ $\quad N = \dfrac{L}{H}$, $H = \dfrac{L}{N} = \dfrac{30}{3445} = 0,008$ Cm

$R = 1,5$

$l_A = l_B$

$R = \dfrac{1}{4} \dfrac{(\alpha - 1)}{\alpha} \dfrac{k'_B}{(k'_B + 1)} \sqrt{N_B}$

Colonne 1 $\quad R_1 = f(\sqrt{N_1}) = cte\ \sqrt{N_1}$

Colonne 2 $\quad R_2 = f(\sqrt{N_2}) = cte\ \sqrt{N_2}$

$\dfrac{R_1}{R_2} = \dfrac{\sqrt{N_1}}{\sqrt{N_2}}$ $\qquad N_2 = \left(\dfrac{R_2}{R_1}\right)^2 N_1$

$N_1 = N_{moy}$ $\qquad N_2 = \left(\dfrac{R_2}{R_1}\right)^2 N_{moy} = \left(\dfrac{1,5}{1,06}\right)^2 3445$

$N_2 = 6898$ plateaux

$L = H \cdot N = 6898 \cdot 0,008 = 55$ cm

$N_B = 16 \left(\frac{t_{rB}}{l_B}\right)^2$ $\sqrt{\frac{N_B}{16}} \cdot l_B = \sqrt{t_{rB}}$, N_B nbre de plateaux ds la 2ème colonne $N_B \simeq N_{moy} \simeq N_2$

$t_{rB} = l_B \cdot \sqrt{\frac{N_B}{16}} = 1,21 \cdot \sqrt{\frac{6898}{16}} = 25,12$ min

t_{rB} ds la 2ème colonne de longueur 55 Cm

EXO2

$v = \frac{L}{t_m} = \frac{55}{2,3} = 21,73$ m/min

$k'_A = \frac{t_{rA} - t_m}{t_m} = 3,15$ $k'_B = 3,43$ $k'_C = 4,41$

$N_A = 16 \left(\frac{t_{rA}}{l_A}\right)^2$ $N_A = 2224$ $N_B = 1510$ $N_C = 1871$

$H_A = \frac{L}{N_A} = \frac{55}{2224} = 0,022$ m. $H_B = \frac{L}{N_B}$ $H_C = \frac{L}{N_C}$

$R_{A-B} = 2 \frac{t_{rB} - t_{rA}}{(l_B + l_A)} = 2 \left(\frac{10,20 - 9,55}{(9,81 + 1,05)}\right) = 0,69$ mauvaise séparation

$R_{B-C} = 2 \left(\frac{t_{rC} - t_B}{l_B + l_C}\right) = 2 \left(\frac{12,45 - 10,20}{1,05 + 1,15}\right) = 2$ bien séparé

$\%A = \frac{A_A \times 100}{\sum A} \frac{A_A}{A_A + A_B + A_C} \times 100 =$

$= \frac{A_A \times 100}{\sum A} = \frac{A_A}{A_A + A_B + A_C} \times 100 = \frac{21060}{21060 + 29940 + 35850} \times 100$

$\%A = 24,2\%$ $\%B = 34,5\%$ $\%C = 41,3\%$

$\sum = 100\%$

CPG EXO3

Solu EXO3

(a) $N_A = 16 \left(\frac{t_{rA}}{l_A}\right)^2 = 16 \left(\frac{60}{9}\right)^2 = 711$

(b) $R_{B-C} = 2\left(\frac{t_{rC} - t_{rB}}{l_B + l_C}\right) = 2\left(\frac{110 - 100}{15 + 16,50}\right) = 0,63$ mal séparé

$R_{D-E} = 2\left(\frac{t_{rE} - t_{rD}}{l_E + l_D}\right) = 2\,\frac{(165+140)}{(21 + 24,75)} = 1,09$ mal séparé

$N_2 = \left(\frac{R_2}{R_1}\right)^2 \cdot N_1$ $\quad N_2 = \frac{L_2}{H}$ $\quad N_1 = \frac{L_1}{H}$

$L_2 = \left(\frac{R_2}{R_1}\right)^2_{B-C} \cdot L_1 = \left(\frac{1,5}{0,63}\right)^2_{B-C} \cdot 120 = 680$ Cm

$L_2 = \left(\frac{R_2}{R_1}\right)^2_{D-E} \cdot L_1$ $\quad \frac{L_2}{L_1} \cdot R_{1\,D-E}^2 = R_{2\,D-E}^2$

$R_{2\,D-E} = R_{1\,D-E} \sqrt{\frac{L_2}{L_1}} = 1,09 \sqrt{\frac{680}{120}} = 2,6$ bien séparé.

$\frac{N_2}{N_1} = \frac{L_2}{L_1} = \frac{16\left(\frac{t_{r2}}{l}\right)^2}{16\left(\frac{t_{r1}}{l}\right)^2} = \frac{t_{r2}^2}{t_{r1}^2}$

$t_{r2} = t_{r1} \cdot \sqrt{\frac{L_2}{L_1}} = 237 \sqrt{\frac{680}{120}} = 559,4$ sec.