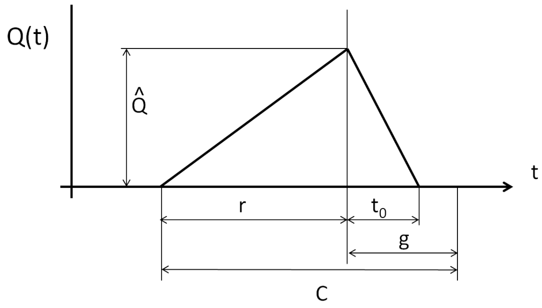
Cues amb servei a pulsos (pulsed service queues)



$t_0 = \frac{y\ r}{1-y}$

$\hat{Q} = q \cdot r$

$y = q/\mu$

$$L_q = \frac{1}{C}\int_0^C Q(t)dt = \frac{(r+t_0)}{C}\frac{q\cdot r}{2} = \frac{1}{C}\left[\frac{q\cdot r^2}{2} + t_0\frac{q\cdot r}{2}\right]$$

$$W_q = \text{demora determinista} = \frac{L_q}{q} = \frac{r(r+t_o)}{2C} = \frac{r^2}{2C(1-y)} = \frac{C}{2}\frac{(1-\lambda)^2}{(1-y)}$$

Se suposa $q_i(r_i+g_i) \leq \mu g_i$ per n cicles $i = 1, 2, 3, \ldots n$

$$W_q^{(i} = \frac{r_i^2}{2C_i(1-y_i)} \mapsto E[w_q] \approx \frac{1}{n}\sum_{i=1}^{n} W_q^{(i}$$

$$E[w_q] = \frac{\textsf{Demora total}}{\textsf{Total pax. arribats}} = \frac{\sum_{i=1}^{n} W_q^{(i} q_i C_i}{\sum_{i=1}^{n} q_i C_i} = \left(\sum_{i=1}^{n}\frac{q_i r_i^2}{2(1-y_i)}\right) \Bigg/ \left(\sum_{i=1}^{n} q_i C_i\right)$$

Si q es manté constant (aproximadament) durant els n cicles: $q_1 \approx q_2 \approx \ldots$:

$$E[w_q] \approx \frac{\sum_{i=1}^{n} r_i^2}{2(1-y)\sum_{i=1}^{n} C_i} = \frac{E[r^2]}{2(1-y)E[C]} = \frac{1}{2(1-y)}\ \frac{E^2[r]+Var[r]}{E[C]} = \frac{E[r]}{2(1-y)}\ \frac{E[r]}{E[C]}\ (1+\mathcal{C}_r^2)$$