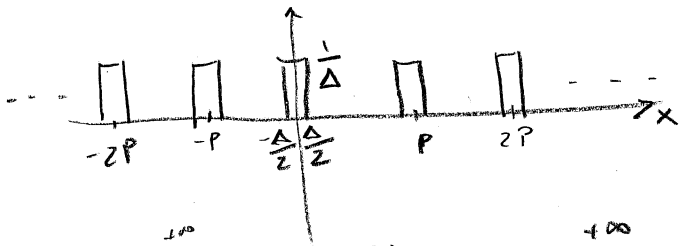
APPENDICE
FORMULA DI POISSON

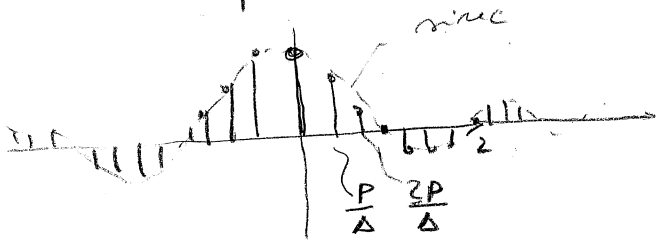
P periodo



$$f_\Delta(x) = \sum_{n=-\infty}^{+\infty} \frac{1}{\Delta}\Pi\left(\frac{x-nP}{\Delta}\right) = \sum_{k=-\infty}^{+\infty} c_k e^{-j2\pi\frac{x}{P}k}$$ (serie di Fourier esponenziale)

$$c_k = \frac{1}{P}\int_{-P/2}^{P/2} \frac{1}{\Delta}\Pi\left(\frac{x}{\Delta}\right) e^{j2\pi\frac{x}{P}k}\,dx = \frac{1}{P\Delta}\int_{-\Delta/2}^{\Delta/2} e^{j\frac{2\pi}{P}k}\,dx = \frac{1}{P\Delta}\,\frac{e^{j\frac{2\pi}{P}k}}{j\frac{2\pi}{P}k}\Bigg]_{-\Delta/2}^{\Delta/2}$$

$$= \frac{1}{\Delta\pi}\,\frac{e^{j\frac{2\pi}{P}\frac{\Delta}{2}k} - e^{-j\frac{2\pi}{P}\frac{\Delta}{2}k}}{2jk} = \frac{1}{P}\,\frac{\sin\frac{\pi\Delta}{P}k}{\frac{\Delta\pi k}{P}} = \frac{1}{P}\,\mathrm{sinc}\,\frac{\Delta}{P}k$$



$$f_\Delta(x) = \sum_{k=-\infty}^{+\infty} \frac{1}{P}\,\mathrm{sinc}\,\frac{\Delta}{P}k\; e^{-j\frac{2\pi}{P}xk}$$

commento!

$\Delta \to 0$, $\quad f_\Delta(x) \longrightarrow \sum_{n=-\infty}^{+\infty} \delta(x-nP)$

$$\frac{1}{P}\,\mathrm{sinc}\,\frac{\Delta}{P}k \to \frac{1}{P} \quad \forall k$$

$$\boxed{\frac{1}{P}\sum_{n=-\infty}^{+\infty} e^{-j\frac{2\pi}{P}nx} = \sum_{n=-\infty}^{+\infty}\delta(x-nP)}$$