Ejercicio 1

$$q_n = \tilde{\mathbb{P}}(N_t = n) = \frac{e^{-\lambda}\lambda^n}{n!} \mathbb{1}_{(n\geq 2)}$$

$$\mathbb{Q}(N_t = n) \begin{cases} 0 & \mathbb{1}_{(n=0)} \\ 1/3 & \mathbb{1}_{(n=1)} \\ \dfrac{\left(\frac{2}{3}\right)\left(\frac{e^{-\lambda}\lambda^n}{n!}\right)}{1-\sum_{n=0}^{1} e^{-\lambda}\frac{\lambda^k}{k!}} & \mathbb{1}_{(n\geq 2)} \end{cases}$$

Ejercicio 2

BINOMIAL COMO BASE

$$q_n = p_n = \binom{100}{n}\left(\frac{1}{3}\right)^n\left(\frac{2}{3}\right)^{100-n} \mathbb{1}_{\{15,16,\dots,100\}}(n)$$

$$\Rightarrow \left(1 - \sum_{k=15}^{100} \binom{100}{n} \frac{1}{3}^n \left(\frac{2}{3}\right)^{100-n}\right)$$

REDISTRIBUYENDO

$$\frac{Po(n|\lambda)}{1-\sum_{15}^{\infty} Po(n|\lambda)} = \frac{e^{-\lambda}\cdot\lambda^n/n!}{1-\sum_{k=15}^{\infty} e^{-\lambda}\frac{\lambda^k}{k!}}$$

$$\mathbb{Q}(N_t = n) = \begin{cases} \left(1-\sum_{k=15}^{100}\binom{100}{n}\left(\frac{1}{3}\right)^n\left(\frac{2}{3}\right)^{100-n}\right)\dfrac{e^{-\lambda}\cdot\lambda^n/n!}{1-\sum_{k=15}^{\infty} e^{-\lambda}\frac{\lambda^k}{k!}} & \mathbb{1}_{\{0,1,\dots,15\}}(n) \\ \binom{100}{n}\left(\frac{1}{3}\right)^n\left(\frac{2}{3}\right)^{100-n} & \mathbb{1}_{\{15,16,\dots,100\}}(n) \end{cases}$$

a) Poisson como base

$$q_n = \tilde{\mathbb{P}}(N_t = n) = \frac{e^{-\lambda} \cdot \lambda^n}{n!} \mathbb{1}_{\{n \leq 15\}}$$

$$\Rightarrow \left(1 - \sum_{k=0}^{15} \frac{e^{-\lambda} \lambda^k}{k!}\right)$$

condicionamos la binomial $n > 15$

$$\frac{\binom{100}{n} 1/3^n (1 - 1/3)^{100-n} \mathbb{1}_{(n > 15)}}{\left(1 - \sum_{k=0}^{14} \binom{100}{k} \theta^k (1-\theta)^{100-k}\right)}$$

$$q_n = \left(1 - \sum_{k=0}^{15} \frac{e^{-\lambda} \lambda^k}{k!}\right) \cdot \left(\frac{\binom{100}{n} \frac{1}{3}^n \left(\frac{2}{3}\right)^{100-n} \mathbb{1}_{(15, 16, \ldots 100)}}{1 - \sum_{k=0}^{14} \binom{100}{k} \theta^k (1-\theta)^{100-k}}\right)$$

$$\mathbb{Q}(N_t = n) = \begin{cases} e^{-\lambda} \cdot \dfrac{\lambda^n}{n!} \quad \mathbb{1}_{\{n \leq 15\}} \\ \left(1 - \sum_{k=0}^{15} e^{-\lambda} \dfrac{\lambda^k}{k!}\right) \left(\dfrac{\binom{100}{n} \frac{1}{3}^n \left(\frac{2}{3}\right)^{100-n} \mathbb{1}_{(15, 16, \ldots, 100)}}{1 - \sum_{k=0}^{14} \binom{100}{k} \theta^k \left(1 - \frac{1}{3}\right)^{100-k}}\right) \mathbb{1}_{(n \geq 15)} \end{cases}$$