$$\mathbb{E}[S_0] = \mathbb{E}\left[\sum_i S_i\right] = \mathbb{E}\left[\mathbb{E}[\Sigma S_i | C]\right]$$

$$= \mathbb{E}\left[C\,\mathbb{E}[S_i \mid (C \geq 1)]\right]$$

$$= \mathbb{E}C\,\mathbb{E}S_i$$

If $X \sim \text{Exp}(\theta)$ (θ → mean) $\quad \mathbb{E}X = \theta$.

then $X^\tau \sim \text{Weibull}(\theta^\tau, 1/\tau)$

$$\mathbb{E}[X^\tau] = \theta^\tau \Gamma(1+\tau)$$

$$S^{2/D} \sim \text{Exp}\left(\frac{2\pi\omega^2}{u^2\Gamma(1+D/2)^{2/D}}\right)$$ (ω^2 → mean, not rate!)

$$\Rightarrow S_i \sim \text{Wei}\left(\left(\frac{2\pi\omega^2}{u^2}\right)^{D/2}\Gamma(1+D/2)^{-1},\ 2/D\right)$$

$$\mathbb{E}\left[\omega(\lambda_1^{2/D})\right] \Rightarrow \lambda = \frac{\mathbb{E}S}{\mathbb{E}C}\Gamma^{-1}(1+D/2)$$