Poisson-GP

threshold u

λ_u (rate)

σ_u (scale)

ξ (shape)

exceedances over u: $T_i \sim \text{PoisProc}(\lambda_u)$
marks: $Y_i \sim \text{GP}(u, \sigma_u, \xi)$
excesses: $Y_i - u \sim \text{GPD}(0, \sigma_u, \xi)$.

Point-Process

ref. duration $w > 0$

$\mu_w^\star$ (location)

$\sigma_w^\star$ (scale)

$\xi^\star$ (shape)

The maximum M of the marks Y_i on an interval with duration w has a tail which is $\text{GEV}(\mu_w^\star, \sigma_w^\star, \xi^\star)$. It has a mixed distribution with an atom at $M = -\infty = \sup(\varnothing)$.