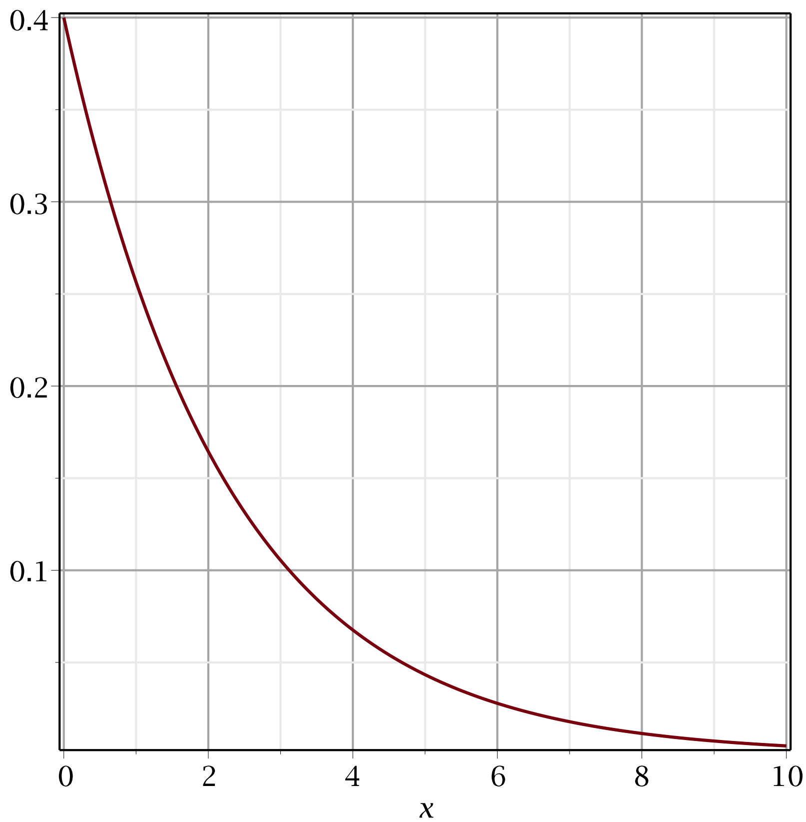
```
> restart; assume(alpha > 0, beta > 0);
> with(cl) : # Hawkes process with P=1
> nu := (alpha, beta, t) -> alpha·exp(-alpha/beta·t); # kernel function
```

$$\nu := (\alpha, \beta, t) \mapsto \alpha\, e^{-\frac{\alpha t}{\beta}} \tag{1}$$

```
> lambda := int(nu(alpha, beta, t), t = s..t)
```

$$\lambda := \beta\, e^{-\frac{\alpha s}{\beta}} - \beta\, e^{-\frac{\alpha t}{\beta}} \tag{2}$$

```
>
>
> pgl(nu(0.4, 0.9, t), 0..10)
```




```
> assume(a > 0); assume(b > 0);
> int(nu(a, b, t), t = 0..inf)
```

$$b \tag{3}$$

```
> lambda := unapply(int(nu(alpha, beta, t), t = s..u), alpha, beta, s, u);
      # intensity function
```

$$\lambda := (\alpha, \beta, s, u) \mapsto \beta\, e^{-\frac{\alpha s}{\beta}} - \beta\, e^{-\frac{\alpha u}{\beta}} \tag{4}$$

```
> Lambda := unapply(factor(int(lambda(alpha, beta, s, t), t = s..u)), alpha, beta, s,
    u); # compensator
```

$$\Lambda := (\alpha, \beta, s, u) \mapsto \frac{\beta \left(u\,\alpha + \beta\, e^{\frac{\alpha (s-u)}{\beta}} - \alpha\, s - \beta\right) e^{-\frac{\alpha s}{\beta}}}{\alpha} \tag{5}$$

```
>
> InvComp := unapply(factor(solve(Lambda(alpha, beta, s, u) = eps, u)), alpha,
    beta, s, eps);
    # solve for the stopping-time u, given the params \Theta={alpha,beta}, a
    starting-time , and a value of the ideally-unit-exponentially distributed \eps
```

$$InvComp := (\alpha, \beta, s, \varepsilon) \mapsto \frac{W\left(-e^{-\frac{e^{-\frac{\alpha s}{\beta}}\beta^2 + \varepsilon\alpha}{e^{-\frac{\alpha s}{\beta}}\beta^2}}\right) e^{-\frac{\alpha s}{\beta}}\beta^2 + e^{-\frac{\alpha s}{\beta}}\alpha\,\beta\, s + e^{-\frac{\alpha s}{\beta}}\beta^2 + \varepsilon\,\alpha}{\beta\, e^{-\frac{\alpha s}{\beta}}\,\alpha} \tag{6}$$

```
>
> int(InvComp(1, 1, 0, eps)·exp(-eps), eps = 0..inf);
    # 1 rather singular case which has a closed-form symbolic answer
```

$$-1 + e \tag{7}$$

```
>
```