Tam veriye ulaşmak zordur.

T → Bozulma süresi

$R(t) = P(T > t)$ → Sağlam güvenilir (Bozulmama = Güvenilirlik)

$P(T \leq t) = \int_{-\infty}^{t} f(t)\,dt$ $\quad R(t) = 1 - F(t)$

Bozulma olasılığı

$$f(t) = \frac{dF(t)}{dt} = \frac{d}{dt}(1 - R(t)) = -\frac{dR(t)}{dt}$$

$$f(t) = -\frac{dR(t)}{dt}$$

$$f(t) = \frac{dF(t)}{dt} = \lim_{\Delta t \to 0} \frac{F(t+\Delta t) - f(t)}{\Delta t}$$

$$= \lim_{\Delta t \to 0} \frac{P(t < T < t+\Delta t)}{\Delta t}$$

$$f(t) = -\frac{dR(t)}{dt}$$

i) $t > 0$ için $f(t) \geq 0$

ii) $\int_{-\infty}^{\infty} f(t)\,dt = 1$

F(t)'nin özellikleri

i) Azalmayan

ii) Sağdan sürekli

iii) $\lim_{t \to \infty} F(t) = 1$

$\lim_{t \to 0} F(t) = 0$

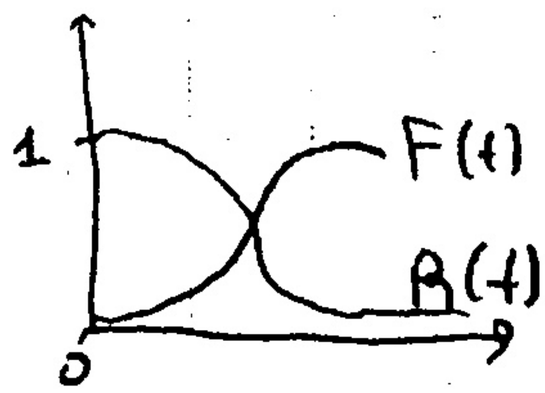
R(t)'nin özellikleri

i) Artmayan

ii) Soldan sürekli

iii) $\lim_{t \to \infty} R(t) = 0$

$\lim_{t \to 0} R(t) = 1$



$$P(t_1 < T < t_2) = f(t_2) - f(t_1)$$
$$= 1 - R(t_1) - (1 - R(t_2))$$
$$= R(t_1) - R(t_2)$$

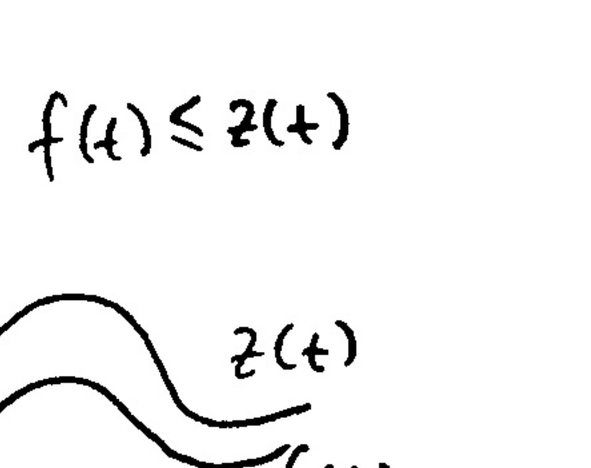
$$P(t < T < t + \Delta t \mid T > t) = \frac{P(A \cap B)}{P(B)} = \frac{P(t < T < t + \Delta t,\ T > t)}{P(T > t)}$$

Hazard function:

$$h(t) = f(t) = \lim_{\Delta t \to 0} \frac{F(t + \Delta t) - F(t)}{R(t)\Delta t} = \frac{1}{R(t)} f(t) = \frac{f(t)}{R(t)}$$

$$f(t) = \frac{-dR(t)}{dt}$$

$$h(t) = z(t) = \frac{f(t)}{R(t)} = \frac{\frac{-dR(t)}{dt}}{R(t)}$$



$$P(t < T < t + \Delta t \mid T > t) \cong z(t)\Delta t$$
$$\cong \frac{f(t)}{R(t)} \Delta t$$

$$z(t) = \frac{f(t)}{R(t)} = \frac{\frac{-dR(t)}{dt}}{R(t)} = -\frac{R'(t)}{R(t)} = \frac{-d \ln(R(t))}{dt}$$

$$\int_0^t z(u)\,du = -\ln(R(t))_{(0 \to t)} = R(t) = e^{-\int_0^t z(u)\,du}$$

$$f(t) = R(t)\, z(t)$$
$$f(t) = z(t)\, e^{-\int_0^t z(u)\,du}$$

$\forall t$ in $f(t) \leq z(t)$