

## M.L.E. for the transition intensity $\mu$

from the joint probability distribution of  $(D_i, V_i)$  we can get the likelihood function in terms of parameter  $\mu$  given observation data  $d$  and  $v$

$$L(\mu; d, v) = e^{-\mu v} \mu^d$$

so the log-likelihood is

$$\log L(\mu) = -\mu v + d \log \mu$$

differentiating with respect to  $\mu$  and setting to zero to find the maximum

$$\frac{d}{d\mu} \log L(\mu) = -v + \frac{d}{\mu} = 0 \text{ gives } \hat{\mu}$$

$$\frac{d}{\hat{\mu}} - v = 0 \quad \therefore \underline{\underline{\hat{\mu} = \frac{d}{v}}}$$