

$u m_u$

$$P(m_u > v | m_u > 0) \neq e^{-v^2/2}$$

$$P(u m_u > v | m_u > 0) = \cancel{\exp}$$

$$= P(\cancel{u m_u} m_u > v/u | m_u > 0)$$

$$= \lim_{u \rightarrow \infty} \frac{(u + v/u)^{N-1}}{u^{N-1}} \frac{\exp(-(u + v/u)^2/2)}{\exp(-u^2/2)}$$

$$E u m_u = 1 \Rightarrow E m_u = \frac{1}{u}$$

whereas $P(m_u > v | m_u = 0)$

$$e^{-\cancel{u} v - v^2/2} \text{ so for large } u, \text{ this is } 0.$$
