

If  $a$  is the **accuracy** and  $m$  the **maximum hit**, then assuming no regeneration the expected number of hits to kill an opponent with  $h$  hitpoints is

$$\langle L' \rangle = \frac{1}{a} \sum_{k=0}^{\lfloor \frac{h-1}{m+1} \rfloor} \left( \frac{m+1}{m} \right)^{h-mk} \left( \frac{-1}{m+1} \right)^k \binom{h-mk-1}{k} \quad (1)$$

For  $h \gg m$  equation 1 has the asymptotic form

$$\langle L' \rangle \sim \frac{2}{am} \left( h + \frac{m-1}{3} \right) \quad (2)$$

If the opponent regenerates every  $T_R$  ticks and is hit every  $T_A$  ticks, then the expected number of hits to kill and the expected number of hitpoints regenerated are

$$\langle L \rangle \approx \frac{1}{1 - \frac{T_A}{T_R} \frac{2}{am}} \left( \langle L' \rangle - \frac{T_A}{T_R} \frac{2(m+1)}{(am)^2} \right) \quad (3)$$

$$\langle R \rangle \approx \frac{T_A}{T_R} \left( \langle L \rangle - \frac{m+1}{am} \right) \quad (4)$$

respectively. The exact values of  $\langle L \rangle$  and  $\langle R \rangle$  can be obtained as solutions to linear systems of  $h$  equations.

The kill rate and damage rate are

$$v_k = \frac{1}{T_A \langle L \rangle} \quad \text{and} \quad v_d = \frac{h + \langle R \rangle}{T_A \langle L \rangle} \quad (5)$$

respectively. In particular, if  $T_A$  is given in seconds,  $v_d$  is the DPS.