$$
\begin{aligned}
sim(q, d) &:= \frac{q \cdot d}{\|q\| \cdot \|d\|} \\
&= \frac{q \cdot d}{\sqrt{\sum_i q_i^2} \cdot \sqrt{\sum_i d_i^2}} \\
&= \frac{q}{\sqrt{\sum_i q_i^2}} \cdot \frac{d}{\sqrt{\sum_i d_i^2}}
\end{aligned}
$$