

$$S(k) = \frac{a}{1 + bk^{5/3}} \quad (1)$$

As $k \rightarrow \infty$, $S(k) \rightarrow \alpha\epsilon^{2/3}k^{-5/3}$. Therefore, $a/b = \alpha\epsilon^{2/3}$.

We also know that the integral of $\int S(k) = tke$. Performing this integral in sympy yields:

$$a = \frac{(\text{sinc}(\beta)tke)^{5/2}}{\alpha^{3/2}\epsilon} \quad (2)$$

$$b = \frac{a}{\alpha\epsilon^{2/3}} \quad (3)$$

where $\beta = 3\pi/5$.