Problem. For any positive integer \( k > 1 \), show that the recurrence defined by \( T_1 = t \),

\[
T_{n+1} = \frac{T_n^k}{\exp(k^n/n^k)} \quad \text{for } n > 1,
\]

converges for any real, positive \( t < \exp(\zeta(k)) \), where \( \zeta(k) = \sum_{i=1}^{\infty} \frac{1}{i^k} \).

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