

Prior Knowledge:

The quadratic formula (二次方程式) : Let $0 = ax^2 + bx + c$ be a quadratic equation in x , then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ are the two solutions to the equation, if they exist.

The Problem:

Find the exact value of $1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \dots}}}}$.

Hint: How can you turn this fraction into a quadratic equation?