Problem 11258 Let F_n denote the nth Fibonacci number. Prove that

$$\sum_{k=0}^{\infty} \frac{F_{3^k} - 2F_{3^k+1}}{F_{3^k} + iF_{2\cdot 3^k}} = i + \tfrac{1}{2}(1 - \sqrt{5}),$$

where $i = \sqrt{-1}$.