$$a_n = \frac{n^3}{3n^3+1} = \frac{n^3/n^3}{(3n^3+1)/n^3} = \frac{1}{3+1/n^3} \ ,$$

so $a_n \to \dfrac{1}{3+0} = \frac{1}{3}$ as $n \to \infty$. Converges