

I9 PartialProd2 Tivenan

Stephen Tivenan

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1 Partial Product

A condition for when a $\prod_{n=1}^{\infty} (1 + \frac{f_n}{g_n})$ converge was when $f_n = n$ and $g_n = n^3$. This infinite series converge to 3.668. The function diverged when $f_n = n$ and $g_n = n^2$. Each term in the series increase by 1. The next infinite series, $\prod_{n=1}^{\infty} (1 + b^n)$ diverges when $b=2$. The infinite series seems to diverge very quickly and are extremely large and long. The infinite series converges when $b = 1/4$. The infinite series converges to 1.3559096738634793 and converges relatively quickly. I did notice a pattern with the first infinite series $\prod_{n=1}^{\infty} n/n^3$. If we increase the denominator by an integer of one, the value to which the series converged decrease by to about each time. For example the $\prod_{n=1}^{\infty} 1/(n^3 + 1)$ converges to 2.676, $\prod_{n=1}^{\infty} 1/(n^3 + 2)$ converges to 2.32, $\prod_{n=1}^{\infty} 1/(n^3 + 3)$ converges to 2.136 and $\prod_{n=1}^{\infty} 1/(n^3 + 4)$ converges to 2.016. A interesting fact that I found as well was that when we initially add the 1 to the denominator the infinite product increases.