Vyšetřujeme konvergenci řady

$$\sum_{n=1}^{\infty} \frac{\binom{3n}{2n}}{n^n}(n+311)!.$$

Použijeme podílové kritérium

$$\begin{aligned}
\lim_{n\to\infty} \frac{a_{n+1}}{a_n} &= \lim_{n\to\infty} \frac{\frac{(3n+3)!}{(2n+2)!(n+1)!} \cdot \frac{(n+312)!}{(n+1)^{n+1}}}{\frac{(3n)!}{(2n)!n!} \cdot \frac{(n+311)!}{n^n}} \\
&= \lim_{n\to\infty} \frac{(3n+3)(3n+2)(3n+1)}{(2n+2)(2n+1)(n+1)} \cdot \frac{n^n}{(n+1)^n} \cdot \frac{n+312}{n+1} \\
&= \frac{27}{4} \cdot \frac{1}{e} \cdot 1 = \frac{27}{4e} > 1
\end{aligned}$$

Řada tedy diverguje.

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