Calculus II
Comparison and limit-comparison tests, part 1

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2019

Example

Determine if $\sum_{n=1}^{\infty} \frac{5}{2n^2+7n+3}$ converges or diverges.

- As $n \to \infty$, the dominant term in the denominator is $2n^2$, so compare with $\frac{5}{2n^2}$.

$$\frac{5}{2n^2+7n+3} < \frac{5}{2n^2}$$

$$\sum_{n=1}^{\infty} \frac{5}{2n^2} = \frac{5}{2} \sum_{n=1}^{\infty} \frac{1}{n^2}$$

- This is a constant times a p-series with $p = 2 > 1$.
- Therefore $\sum_{n=1}^{\infty} \frac{5}{2n^2}$ is convergent.
- Therefore $\sum_{n=1}^{\infty} \frac{5}{2n^2+7n+3}$ is convergent by the Comparison Test.