

# Analisi Matematica 1 - Esercitazione 15

**Esercizio 1.** Studiare la convergenza delle seguenti serie numeriche:

$$1. \sum_{n=1}^{\infty} \sin(\sqrt{4n^4 - n + 1} - 2n^2)$$

$$8. \sum_{n=2}^{\infty} \frac{1}{(\log n)^{\log n}}$$

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

$$9. \sum_{n=2}^{\infty} \frac{1}{(\ln n)^{\ln(\ln n)}}$$

$$3. \sum_{n=1}^{\infty} \frac{1}{n} \ln \left( \frac{\sqrt{n+1}}{1+\sqrt{n}} \right)$$

$$10. \sum_{n=1}^{\infty} \frac{(-1)^n n^2 \ln n}{n^3 + 2}$$

$$4. \sum_{n=1}^{\infty} \frac{n \sin(\log n)}{\sqrt{n} + \log^2 n!}$$

$$11. \sum_{n=1}^{\infty} \frac{(-1)^n n}{n+1}$$

$$5. \sum_{n=1}^{\infty} \frac{\log^3 n}{n\sqrt{n} + n^5 \arctan(1 + e^n)}$$

$$12. \sum_{n=1}^{\infty} \frac{\sqrt[4]{n^4 + 9^n} - n}{n\sqrt{n} + 2^n}$$

$$6. \sum_{n=1}^{\infty} \frac{(\sqrt{2})^{-n}}{\sqrt{5n} + 4^n - 2^n}$$

$$7. \sum_{n=1}^{\infty} \left( \frac{n^2 - 1}{n^2 + 1} \right)^{n^3}$$

$$13. \sum_{n=1}^{\infty} n^3 \left( e^{-\frac{1}{2n^2}} - \cos\left(\frac{n}{n^2 + 1}\right) \right)$$