

Exercises 7.2, Mathematics 1 (12-PHY-BIPMA1)
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Use Taylor's formula to compute the limits:

1.

$$\lim_{x \rightarrow 0} \frac{x - \sin x}{e^x - 1 - x - \frac{x^2}{2}},$$

2.

$$\lim_{x \rightarrow 0} \frac{\ln(1 + x + x^2) + \ln(1 - x - x^2)}{x \sin x},$$

3.

$$\lim_{x \rightarrow 0+} \left(\frac{\sin x}{x} \right)^{\frac{1}{x}},$$

4.

$$\lim_{x \rightarrow 0} \frac{1 - \cos x + \frac{1}{2} \sin^2 x}{x^4},$$

5.

$$\lim_{x \rightarrow 0} \frac{\cos(xe^x) - \cos(xe^{-x})}{x^3}.$$