

Math 135: extra week 3 practice problems

- Use the material in the “Notes on Taylor polynomials” to do the following: For each of the functions below, used the known expansions of e^x , $\sin x$, $\cos x$, and $(1-x)^{-1}$, together with the techniques from the notes to find the 5th order Taylor polynomial (about $a = 0$) for:

$$(x^2 + 1)e^x, \quad \cos(x^3), \quad \sin(x + x^2), \quad \cos(e^x - 1).$$

- In each of the following, compute the limit by using Taylor expansions of the numerator and denominator:

$$\lim_{x \rightarrow 0} \frac{e^x - e^{-x}}{\sin 5x}, \quad \lim_{x \rightarrow 0} \frac{\sin^4 x}{1 - \cos(x^2)}.$$