Math 135: extra week 3 practice problems

• Use the material in the notes "More 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:

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