

$$(1) \quad \|f - f_n\|_\infty = \max_x |f(x) - f_n(x)| \stackrel{S-3}{=} \max_x |f(x)| - \max_x |f_n(x)|$$

$$\stackrel{*}{=} \underbrace{\max_x |f(x)|}_{\|f\|_\infty} - \underbrace{\max_x |f_n(x)|}_{\|f_n\|_\infty}$$

HW 1.4:

$$\left\{ \begin{array}{l} f(x) = \sin x \quad S10 \\ g(x) = \sin\left(x - \frac{\pi}{2}\right) = -\cos x \quad S10 \end{array} \right.$$

$$\left\{ \begin{array}{l} f(x) = 3x - 2x^3, \quad x \in [0, 1] \\ g(x) = \sinh x, \quad x \in [0, 1] \end{array} \right.$$

Plot f, g

Find $\|f\|_\infty, \|g\|_\infty, \|f - g\|_\infty$

Pf of Taylor series: Similar Tech. \equiv
 used in error analysis later.

$$(2) \quad f(x) = f(x_0) + \int_{x_0}^x \underbrace{f^{(1)}(t)}_{f'(t)} dt$$