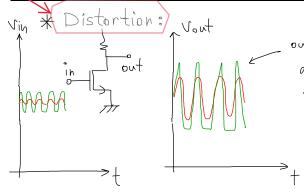
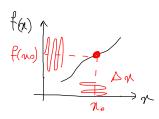


San Jose State University



output shows a large distortion for a large swing input

* long-channel Mosfet equation $I_{DS} = \frac{1}{2} v_h c_0 \times \frac{v_0}{2} (V_{GS} - V_{H})^2$, $\lambda \approx 0$



 $f(n) = f(n_0 + \Delta n) = f(n_0) + \Delta n \frac{\partial f(n)}{\partial n} \Big|_{n_0} + \frac{\Delta^2}{2!} \frac{\partial^2 f(n)}{\partial n^2} \Big|_{n_0} + \frac{3}{3!} \frac{\partial^3 f(n)}{\partial n^3} \Big|_{n_0} + \frac{3}{3!} \frac{\partial^3 f(n)}{\partial n^3} \Big|_{n_0}$

f(n) = IDS, $f(n_0) = IDSQ$, $\Delta n = JgS$,

$$N = \chi_0 + \Delta r = VGS = VGSQ + VgS$$

$$\frac{\partial f(r)}{\partial IDS} = VGSQ + VgSQ + VHO$$

$$\frac{\partial f(x)}{\partial x}\Big|_{x_0} = \frac{\partial I_{DS}}{\partial v_{GS}}\Big|_{v_{GSQ}} = \mu_{v_{COX}} \frac{v_{V_{COX}}}{v_{V_{COX}}} \frac{v_{V_{COX}}}{v_{V_{COX}}} = \frac{\partial I_{DS}}{\partial v_{V_{COX}}}$$

$$\frac{\partial^2 f(v)}{\partial v^2}\Big|_{re} = \frac{\partial^2 I_{DS}}{\partial v G S^2}\Big|_{v G S Q} = \frac{g_m}{v G S Q} = \frac{g_m}{v G S Q} = \frac{g_m}{v G S Q}$$

$$\frac{\partial^3 f(m)}{\partial n^3}\Big|_{N_0} = \emptyset$$

$$\Rightarrow IDS = IDSQ + Vgs \cdot gm + \frac{Vgs}{2} \frac{gm}{Veff} + 0$$

$$\Rightarrow ids = gm \cdot Vgs + \frac{gm}{2Veff} \frac{g}{Vgs}$$

$$\Rightarrow ids = gm \cdot Vgs + \frac{gm}{2Veff} \frac{g}{Vgs}$$

$$gm \cdot Vgs + \frac{gm}{2Veff} \frac{g}{Veff}$$

$$\Rightarrow$$
 ids = gm. Ugs + $\frac{gm}{2Veff}$ Ugs

* fictual model including 3rd order distortion ids=gmygs+ gm vgs+ gm vgs+ gm vgs+ yveff vgs+ yveff large swing sinusoidal gm/gs 10x 3m Ugs 2 left yelf 5