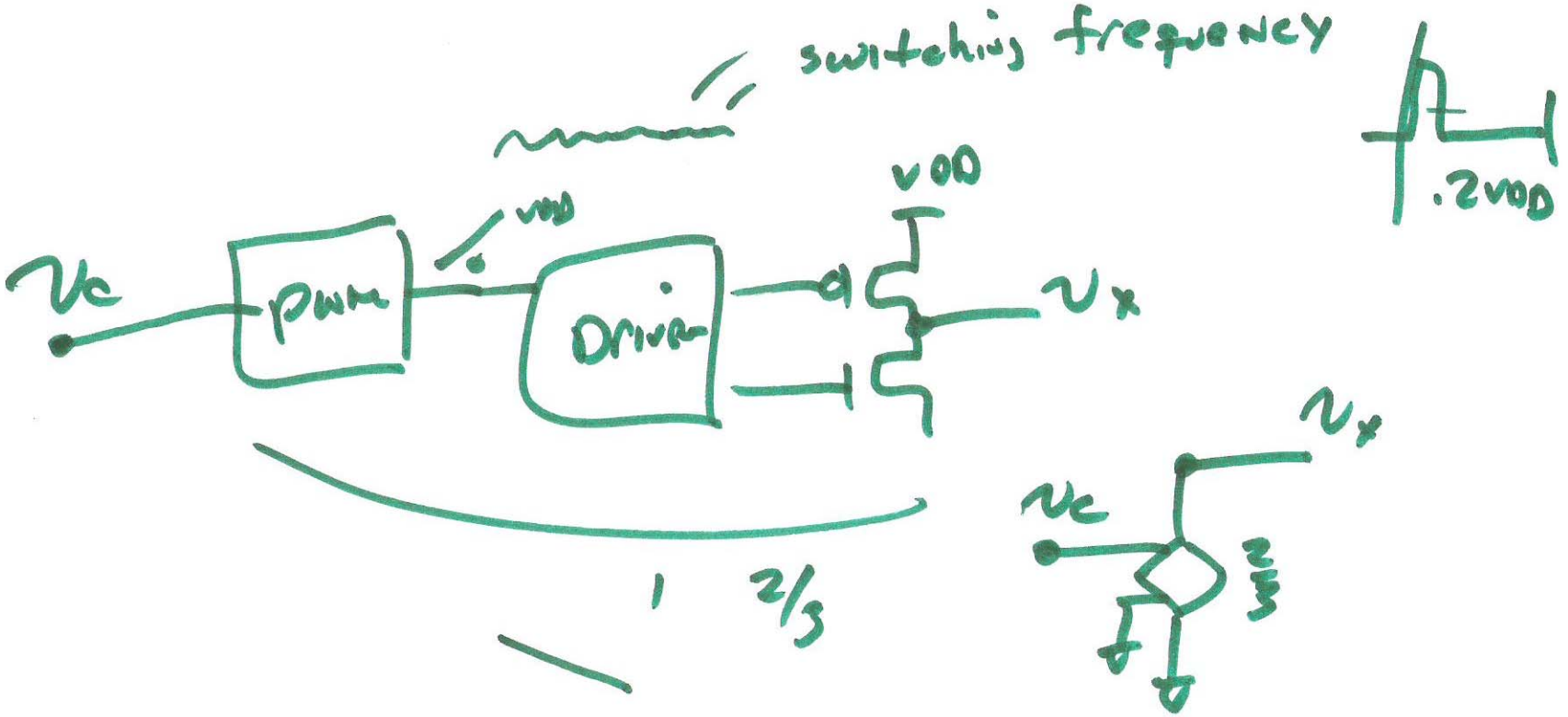
ECE 5/472 Power Electronics

BOISE STATE UNIVERSITY

NOV. 1, 2011 11/1/11

Lecture 20



Switching frequency $\approx$ 2MHz

$$f_0 = 159\,\text{kHz} = \frac{1}{2\pi\sqrt{LC}}$$

$f_{sw} = 15.9\,\text{kHz}$

$$\frac{1}{2\pi R_1 C_1}$$

$$(R_1 C_1)^{-1} = 100 \cdot 10^3$$

$$R_1 C_1 = 10^{-5}$$

$$C_1 = 1\,\text{nF}$$

$$R_1 = \frac{10^{-5}}{10^{-9}} = 10^4$$

2) $C_2 = \frac{C_1}{10} = 100\,\text{pF}$ $= 10\text{K}$

$$\sqrt{LC} = 6.28 \cdot 159 \cdot 10^3$$

$$\sqrt{LC} = 10^{-6}$$

$$LC = 10^{-12}$$

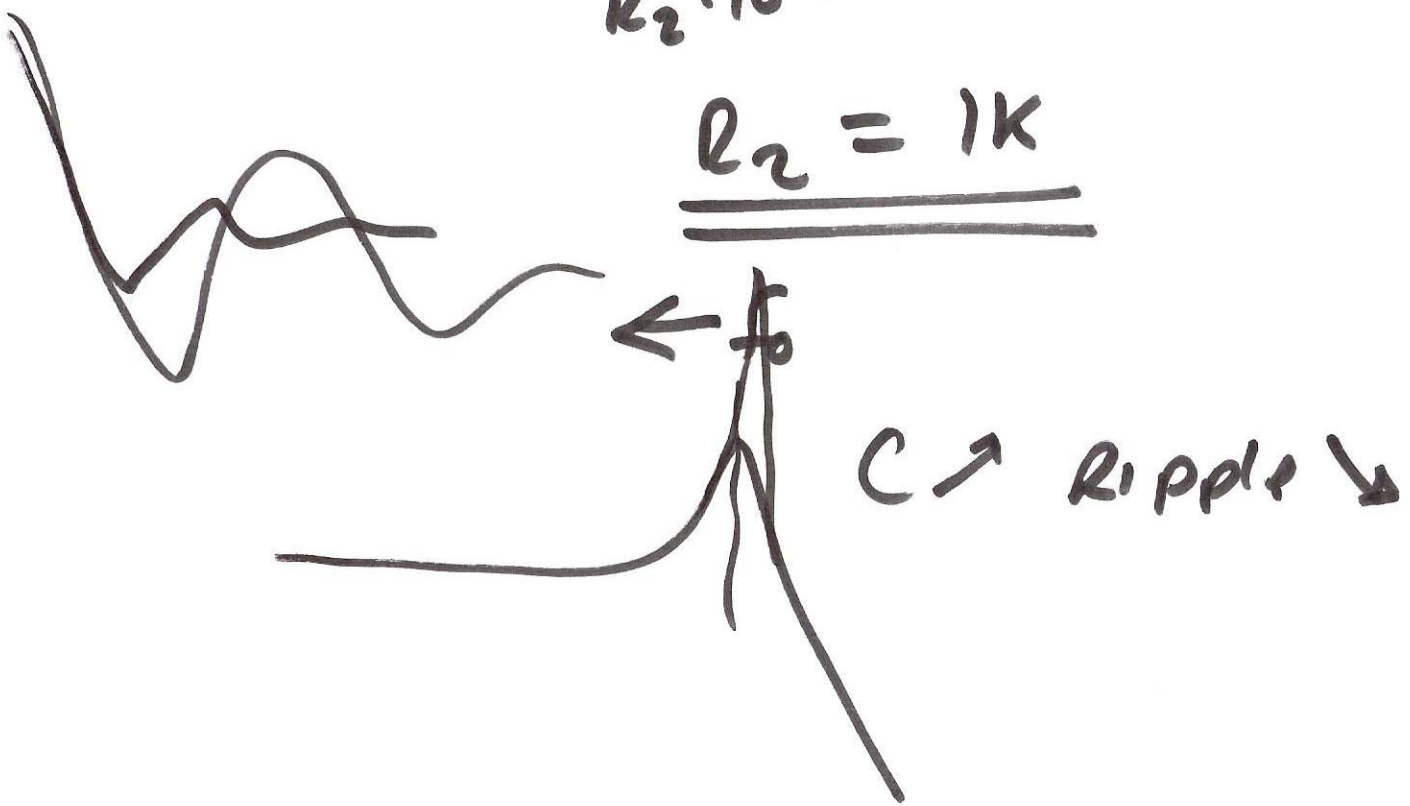
$$L = \frac{100\,\text{nH}}{10^{-7}}$$

$$C = \frac{10^{-12}}{10^{-7}} = 10\,\mu\text{F}$$

$$f_2 = \frac{1}{2\pi R_2 \cdot 10^{-9}} = 159\,KHz$$

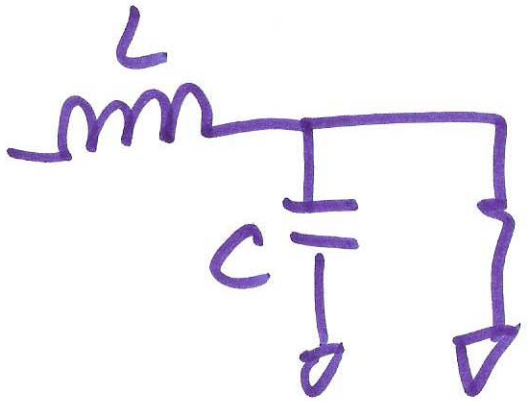
$$\frac{1}{R_2 \cdot 10^{-9}} = 10^6$$

$$R_2 = 1K$$



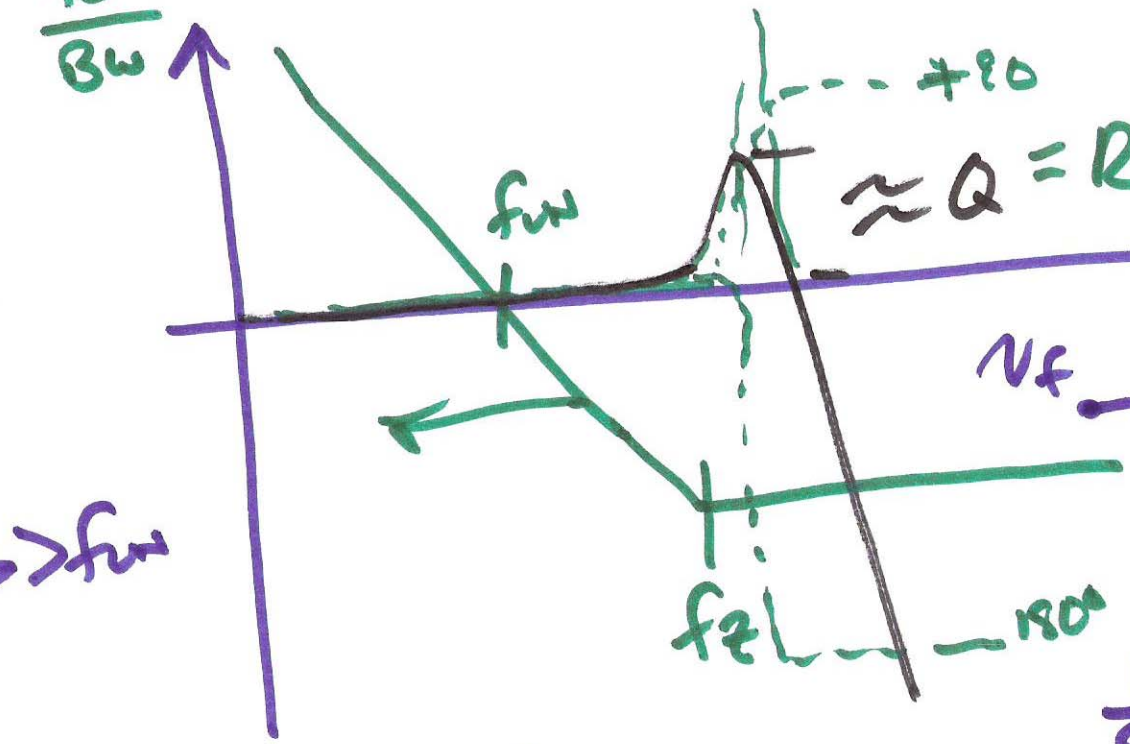
C ↗ Ripple ↘

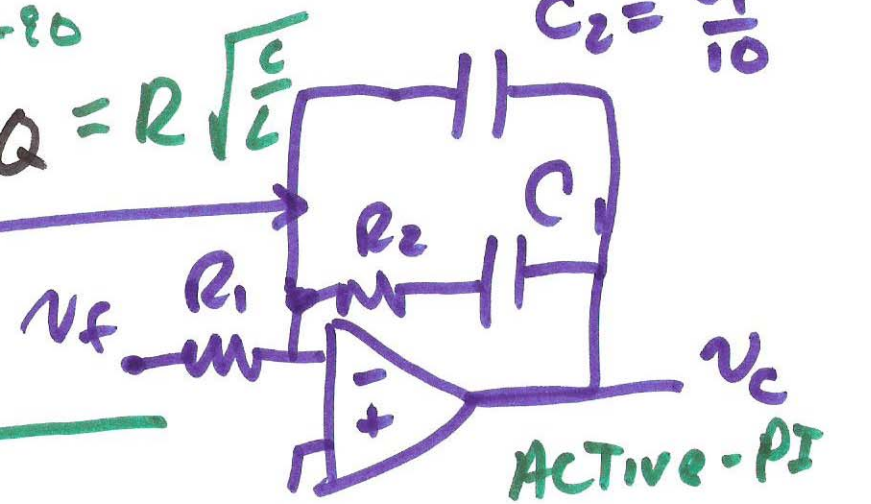
3)



$$Q = R \cdot \sqrt{\frac{C}{L}}$$

$$f_0 = \frac{1}{2\pi\sqrt{LC}}$$





$$= \frac{\frac{1}{sC_1} + R_2}{R_1} = \frac{1 + sC_1R_2}{sC_1R_1}$$

$$f_z = \frac{1}{2\pi C_1 R_2}$$

4)