

## ECE3204 Lecture 21

Intuitive view of stability  
Practical Differentiator  
Stability analysis (Ch. 10)

Handouts:  
Practical Differentiator

Intuitive view of stability

# Practical Differentiator (Lab 6)

The circuit of Figure 6.1 can be made more stable by inserting a resistor in series with the capacitor, as shown in Figure 6.5.

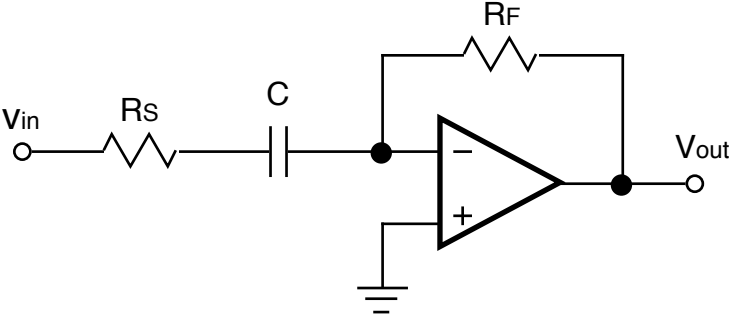


Figure 6.5

## Practical Differentiator: Loop Gain

**1**

Set all independent sources equal to zero

**2**

Break feedback loop (don't change loading)

**2A**

Redraw in  $A, \beta$  format for clarity (optional)

**3**

Find  
 $|A|, |\beta| \quad \angle A, \angle \beta$

## Practical Differentiator: Stability Analysis

**1**

Plot Loop Gain

$$|A\beta| \angle A\beta$$

**2**

Find  $f_1$

Frequency at  
which  $|A\beta|=1$

**3**

Check  $\angle A\beta$  at  $f_1$   
compared to  $-180^\circ$

