

EE 420 / ECG 620

Analog IC Design

Lecture 27

MAY 3, 2017

Study  
Quizzes

HW

midterm

Ch. 9

IV → plotting

open book

square-law, body effect,  $V_{TH}$ ,  $V_{THP}$

$r_o$ ,  $g_m$  → overdrive  
trade-offs,  $W$ ,  $L$ ,  $V_{OV}$

$f_T$  → influence these parameter

EX. 9.5 important  
pins

# Ch. 20

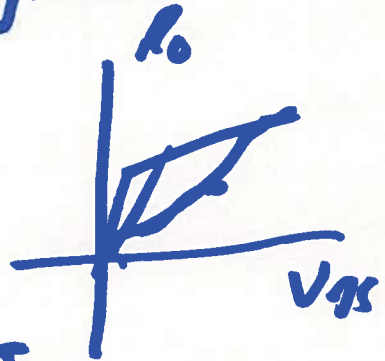
## Current mirror topologies

Wide-swing

CASCODE

regulated-drain

Use of current mirrors



Compliance range

Minimum voltage

ACROSS current

source/sink

BNR problem -

start-up ckt

# Ch. 21 Amplifier

Topologies  $\rightarrow$  C.S.  
C.D.E  $\rightarrow$  S.F.  
C.G

Fig. 21.37

TRANSIMPEDANCE

$$\frac{V}{I} = R$$

TRANSIMPEDANCE

calculate gains

Biasing

OUTPUT Swing

frequency response

pole-splitting

①

②

$R_1, R_2$

$C_1, C_2$

$f_z, f_{ow}$

Diff-amps

Telescopic diff-amp

↓  
Normal diff-amps

Gain

Sw.in

$C_{in} R$

$C_{in} R$

Ch. 23

Band gaps

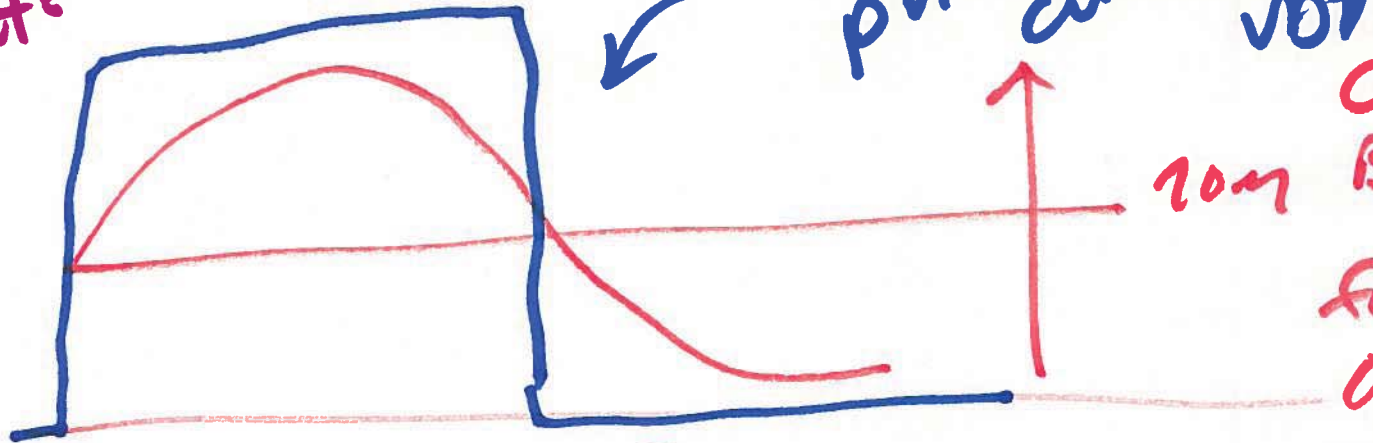
Self-biased

references

PTAT/CTAT

Slew-rate

CLASS A



Always pulling current  $V_{DD}$

Ch. 24

20M BASIC op. amp

folded cascode

0 Rail-to-rail

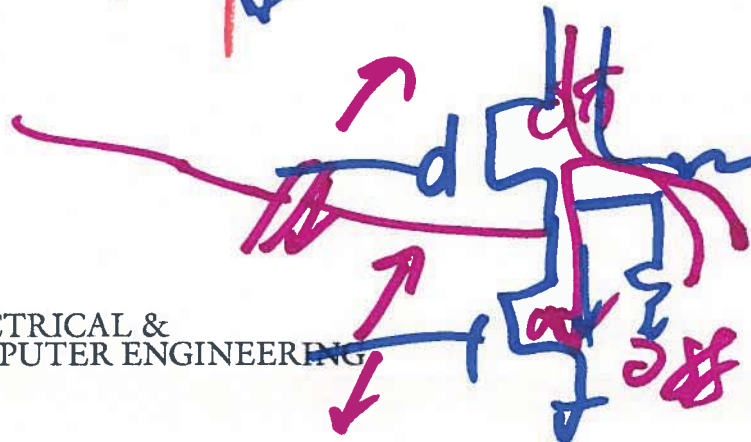
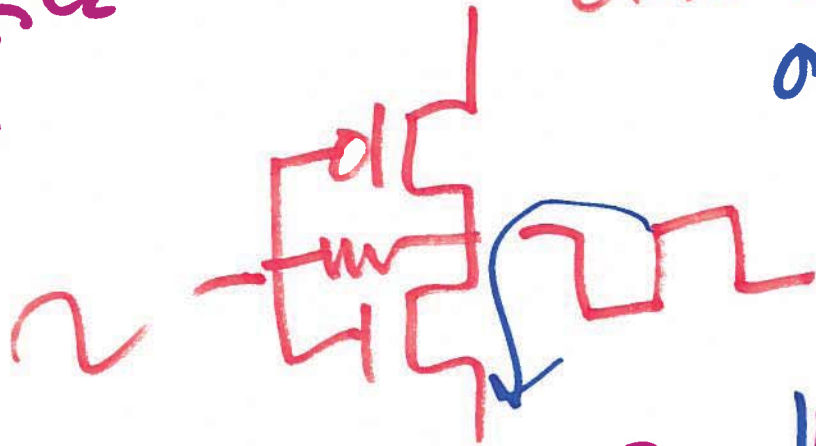
input CMRR PSRR

Comparator

$I_{CC}$

CLASS B

only pull current from  $V_{DD}$  during part of the cycle



projects class AB push-pull

5)