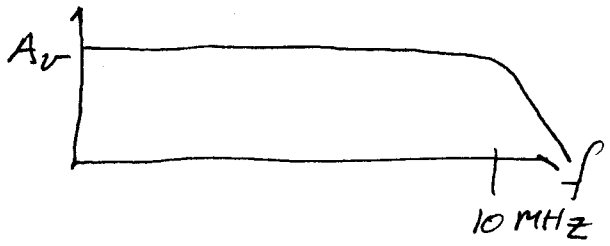
WIDE BAND VIDEO AMP

Recall f_{-3dB} of OP AMP $\approx$ 20 Hz

VIDEO $\Rightarrow$ flat response out into MHz



* Trade off gain for bandwidth
* Use feedback

- V_i large +, M_3 & M_6 cut-off
  - M_2 & M_7 larger V_{GS} ⇒ larger I_D
  - large neg. value I_o
  - ∴ Large I available beyond linear region.

30 V/μs BJT op amps

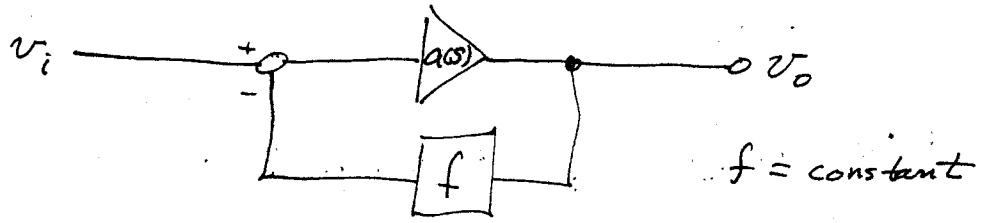
30 V MHz (switch 1 V @ 30 MHz)

END CH. 9

WIDEBAND VIDEO Amps

- Use negative feedback to
- Op Amps → high open loop gain 10^5(100dB) – 10^6(120dB) at low f.
- Sacrifice f response. ⇒ $f_{-3dB} = 5$ Hz
- Video amps – flat, wideband gain up to 4-6 MHz TV; some apps. 50 MHz
- Gain-Bandwidth trade-off
  - Use Reduced load resistance for stages of amp
  - negative feedback

$A_v = G_m R_o$



$$a(s) = \frac{a_o}{1 - \frac{s}{p_1}}$$ single pole

a_o = low f gain.

Overall gain: $$A(s) = \frac{v_o}{v_i} = \frac{a(s)}{1 + f a(s)}$$

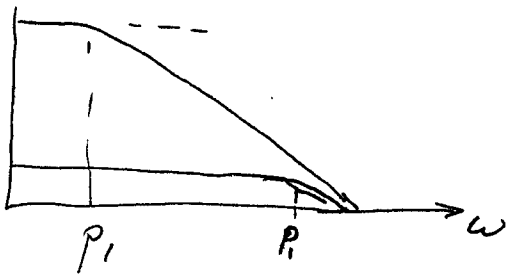
$$A(s) = \frac{\frac{a_0}{1 - s/p_1}}{1 + \frac{a_0 f}{1 - s/p_1}} = \frac{a_0}{1 - \frac{s}{p_1} + a_0 f}$$

$$= \underbrace{\frac{a_0}{1 + a_0 f}}_{A_0} \frac{1}{1 - \frac{s}{p_1(1 + a_0 f)}}$$

Low freq. gain $A_0 = \frac{a_0}{1 + a_0 f}$

New pole $P_1 = p_1(1 + a_0 f)$

f_{-3dB} increased by $(1 + a_0 f)$



(Gain · Bandwidth)$(\omega = 0)$ = const.

Feedback is internal — reducing A_{VD} of diffamp.