Can cascade to improve output resistances

Flattening of curve

$R_e = \frac{19.5}{2}$

$V_{A_1} = 2 \times V_{A_0}$, this makes $V_{A_0}$ smaller.

$V_{E_2} - V_{E_1} = V_{C_1}$

$V_{C_2}$

Current mirrors

2 stage common emitter, diff. gain

MTF Improvement

2 stage common mode, diff. gain
\[ R_0 = \frac{1}{g_{m2}} \frac{1}{\frac{1}{g_{m1}} + s_{m1}} \]

\[ R_1 = -g_m R_0 = -\frac{1}{g_{m1}} \frac{1}{2(g_{m1})} = \frac{-1}{2g_{m1}} \]

Small gain for common mode.

\[ G_m = \frac{g_m}{1 + s_{m1}} \]

\[ G_m = \frac{1}{2} \]

\[ i_0 = \frac{V_i}{Z_{in}} \]

\[ V_i = V_{id} \]

\[ R_D = \frac{V_i}{i_0} \]

\[ i_D = \frac{V_{id}}{Z_{in}} \]

\[ V_{id} = g_m V_i \]

\[ i_D = \frac{1}{2} g_m V_i \]

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