<table>
<thead>
<tr>
<th>active load</th>
<th>intrinsic gain</th>
<th>cascade</th>
</tr>
</thead>
</table>

Last five: 5th response

on 3 slope, so 2 = 1.5

\[ I_{in} \] \[ \Delta v \]

\[ I_{R} \] \[ R \]

What does an ideal source do when \( V = 0 \)?

\[ AV = \frac{V_{out}}{V_{in}} \]

\[ R_{load} = \frac{5}{100} \]

\[ AV = -\frac{V_{out}}{V_{in}} \]
\[ A_v = -\frac{C_m}{R_{out}} \]
\[ g_m = \frac{g_m}{g_{PV}} = \frac{2I_D}{V_{OV}} \]
\[ R_{out} = R_{in} \parallel R_{in} \]
\[ = g_{PV} \parallel g_{PV} \]
\[ = g_{PV} \parallel g_{PV} \]
\[ = \frac{1}{\lambda_0} \parallel \frac{1}{\lambda_0} \]
\[ I_D = \frac{1}{2} \lambda_0 I_D \]
\[ I_C = \frac{1}{2} \lambda_0 I_D \]
\[ = \frac{V_A}{V_{OV}} \]

Intrinsic gain: \( g_m \)
- \( \frac{V_A}{V_T} \) = hundreds BJT
- \( \frac{I_D}{V_{OV}} = \frac{V_A}{V_T} \) = tens velocity sat

Small \( \lambda \), big \( V_A \)

Shortcut channel \( \Rightarrow V_A \) has more effect
- \( \lambda \) bigger, \( V_A \) smaller
- lower \( R_0 \), lower gain

Worst around 65nm
Enhanced help at 22-36 nm