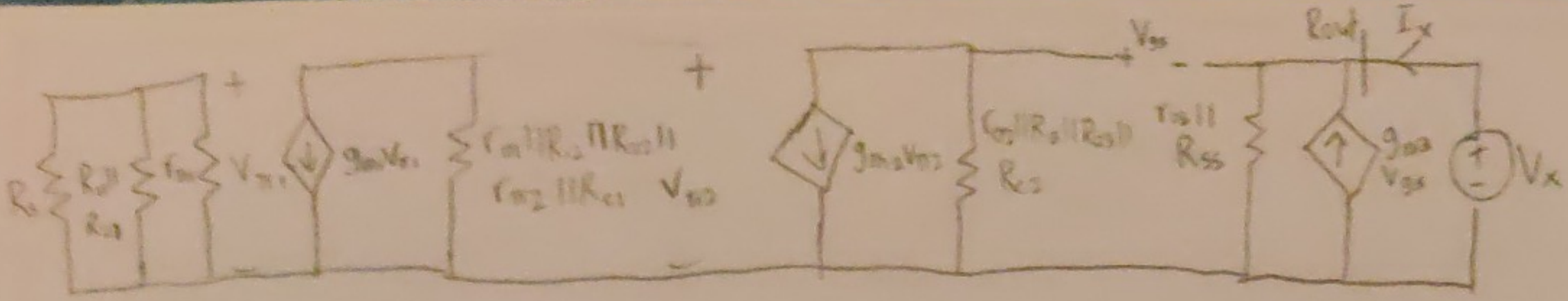
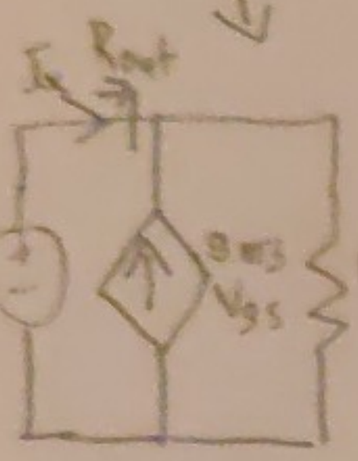


$V_{in1} = 0 = V_{in2} = V_g$



$V_{gs} = V_g - V_s$

$V_{gs} = -V_s = -V_x$

$V_x = (I_x + g_{m3}V_{gs})(r_{o3} \| R_{ss})$

$V_x = (I_x - g_{m3}V_x)(r_{o3} \| R_{ss})$

$V_x + g_{m3}V_x(r_{o3} \| R_{ss}) = I_x(r_{o3} \| R_{ss})$

$V_x(1 + g_{m3}(r_{o3} \| R_{ss})) = I_x(r_{o3} \| R_{ss})$

$V_x = \frac{I_x(r_{o3} \| R_{ss})}{1 + g_{m3}(r_{o3} \| R_{ss})}$

$I_x = I_x$

$R_{out} = \frac{V_x}{I_x}$

$R_{out} = \frac{\frac{I_x(r_{o3} \| R_{ss})}{1 + g_{m3}(r_{o3} \| R_{ss})}}{I_x}$

$= \frac{(r_{o3} \| R_{ss})}{1 + g_{m3}(r_{o3} \| R_{ss})}$

$= \frac{540.263k \| 180k}{1 + 1.924m \times (540.263k \| 180k)}$

$= \frac{69.682k}{1 + 1.924m \times 69.682k}$

$= 515.902\Omega$