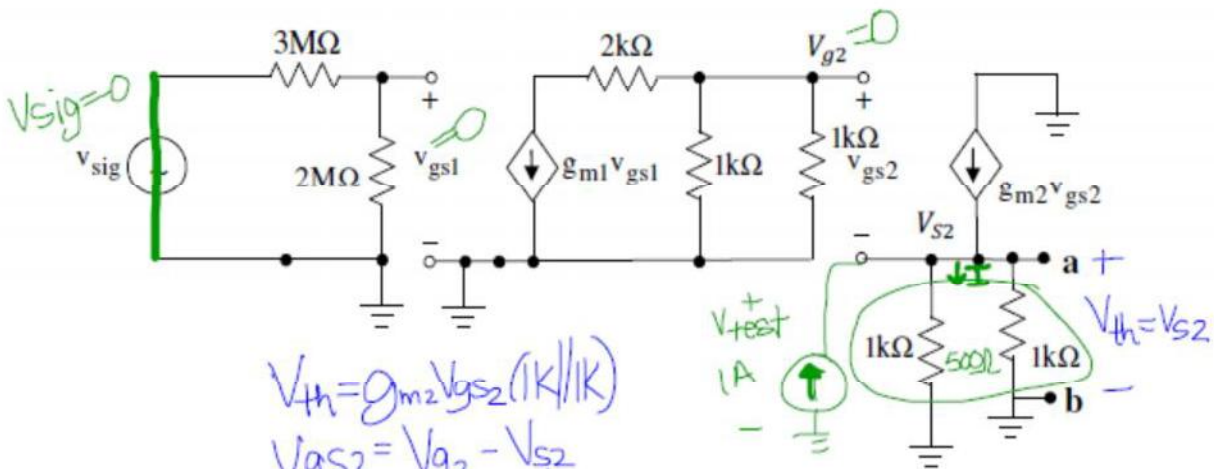


2. Find the Thevenin equivalent (V_{th} and R_{th}) between a-b. (Note: $v_{gs2} = V_{g2} - V_{s2}$) Assume that g_{m1} and g_{m2} are known values.



$$V_{th} = g_{m2} V_{gs2} (1k // 1k)$$

$$V_{gs2} = V_{g2} - V_{s2}$$

$$V_{g2} = -\frac{g_{m1} V_{gs1} (1k)(1k)}{2k}$$

$$V_{gs1} = \frac{2M}{5M} v_{sig}$$

$$V_{gs2} = -g_{m1} V_{gs1} (500) - g_{m2} V_{gs2} 500$$

$$V_{gs2} (1 + g_{m2} 500) = -g_{m1} V_{gs1} 500$$

$$V_{gs2} = \frac{-g_{m1} V_{gs1} 500}{(1 + g_{m2} 500)}$$

$$V_{th} = g_{m2} 500 \frac{g_{m1} 500}{(1 + g_{m2} 500)} \cdot \frac{2}{5}$$

$$R_{th} = \frac{V_{test}}{I}$$

$$V_{test} = I(500)$$

$$-I + 1A + g_{m2} V_{gs2} = 0$$

$$V_{gs2} = V_{g2} - V_{s2}$$

$$V_{gs2} = 0 - V_{test}$$

$$I = 1 - g_{m2} V_{test}$$

$$V_{test} = 500 - g_{m2} V_{test} 500$$

$$V_{test} (1 + g_{m2} 500) = 500$$

$$V_{test} = \frac{500}{1 + g_{m2} 500}$$

$$R_{th} = \frac{500}{1 + g_{m2} 500}$$

$$R_{th} = \frac{1}{g_{m2}} // 500$$