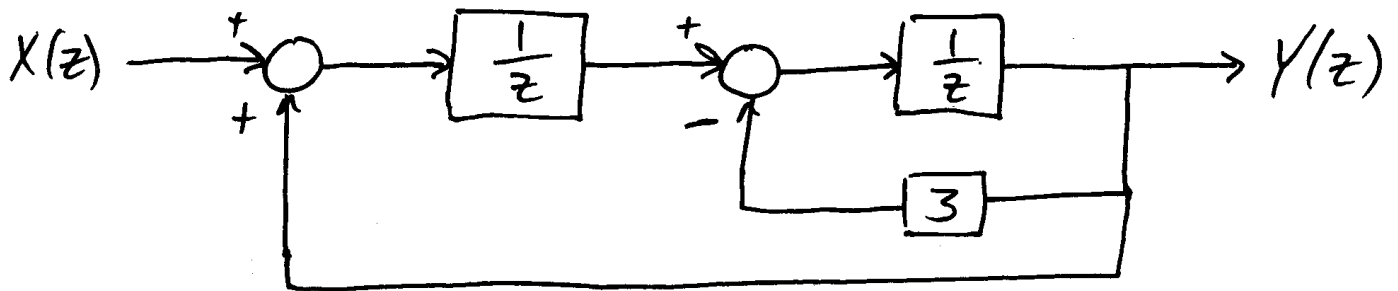
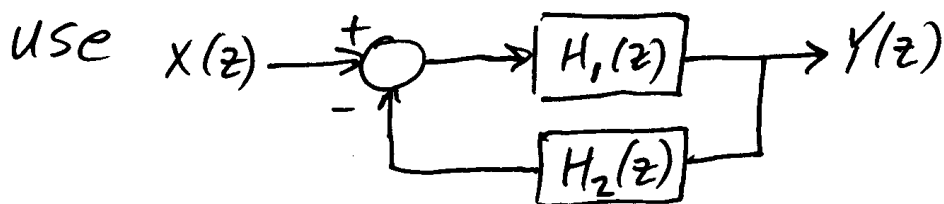


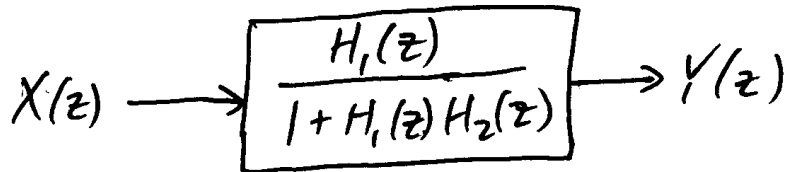
Example- Find the system transfer function $H(z)$ by block-diagram reduction.



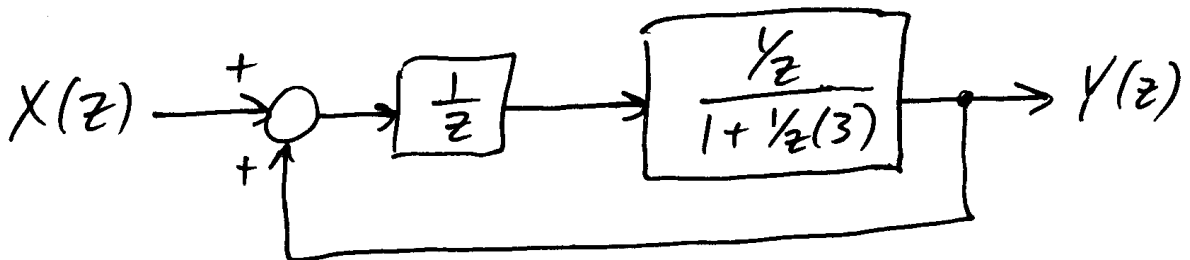
step 1 Reduce feedback loop on right.



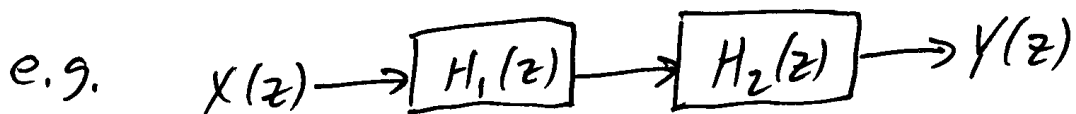
|||



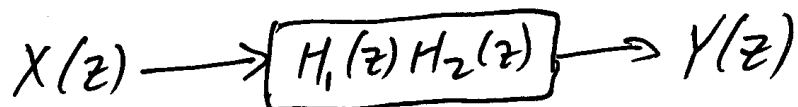
Let $H_1(z) = \frac{1}{z}$ and $H_2(z) = 3$, to get



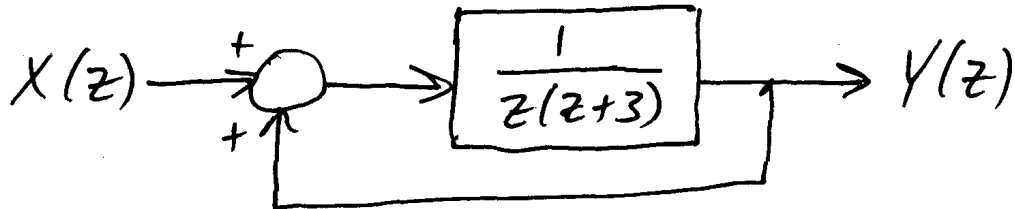
step 2 Use series combination



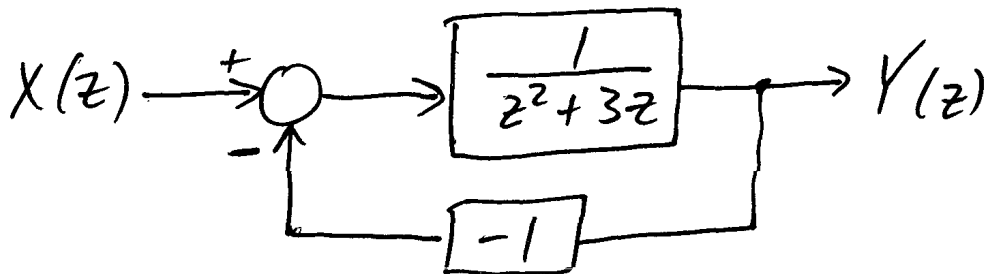
|||



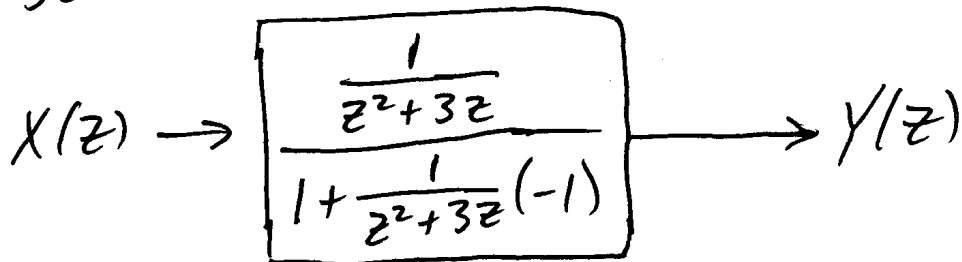
Step 2 cont. Let $H_1(z) = \frac{1}{z}$ & $H_2(z) = \frac{1/z}{1 + \frac{1}{2}(3)}$,
to get



Step 3 Redraw circuit and use feedback loop reduction



Let $H_1(z) = \frac{1}{z^2 + 3z}$ and $H_2(z) = -1$, to
get



$$H(z) = \frac{Y(z)}{X(z)} = \frac{\frac{1}{z^2 + 3z}}{1 + \frac{1}{z^2 + 3z}(-1)}$$

$$\underline{\underline{H(z) = \frac{1}{z^2 + 3z - 1} \Rightarrow \text{Same answer!}}}$$