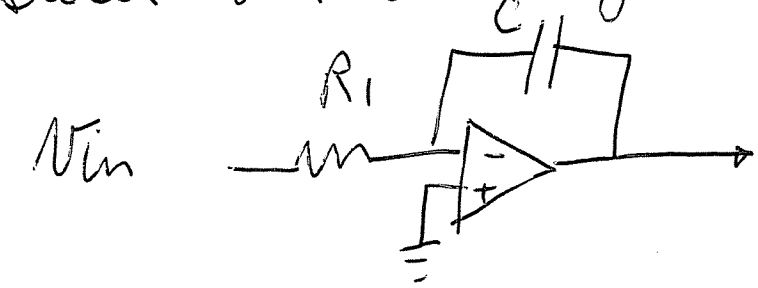
EE511 Lecture 24

Integrate and Dump

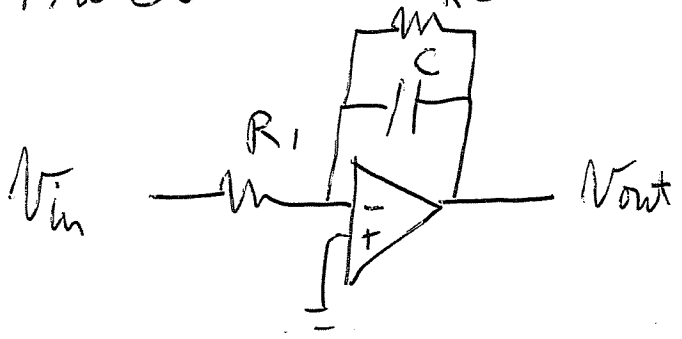
Consider an analog integrator



$$\frac{V_{out}}{V_{in}} = -\frac{Z_f}{Z_i} = -\frac{1/sC}{R_1}$$

$$= \frac{-1}{sR_1C} = \frac{-1}{j2\pi f R_1 C}$$

Practical Integrator or Low Pass Filter



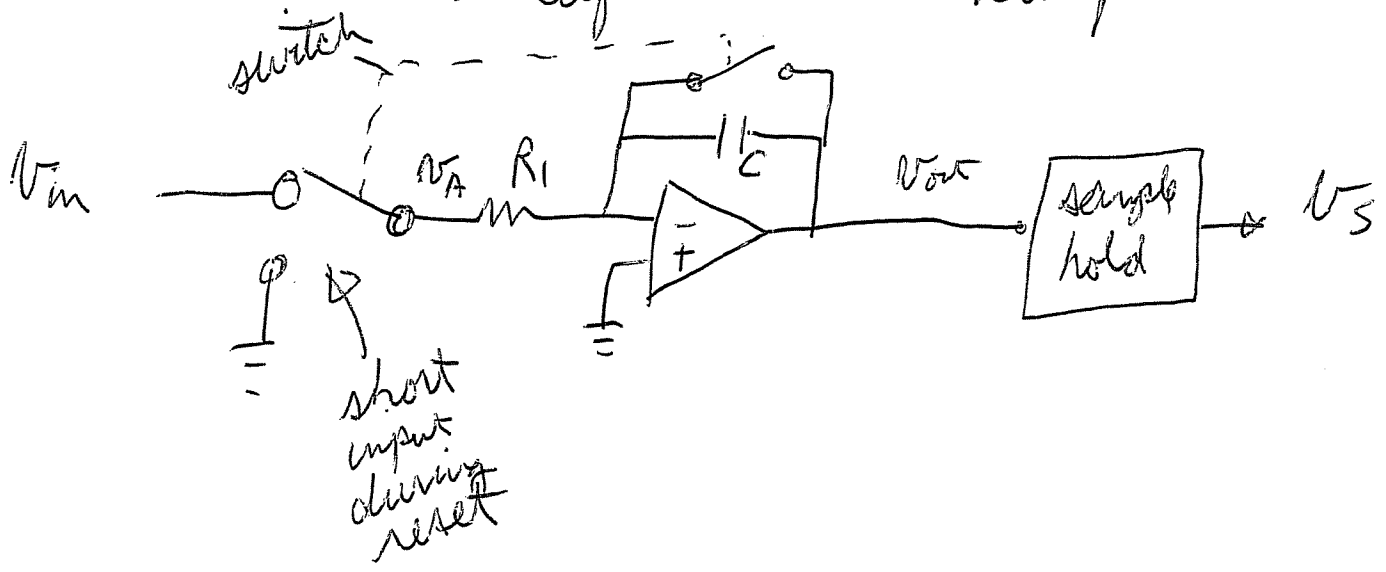
$$H(s) = -\frac{R_2/sC}{\frac{R_2 + 1/sC}{R_1}}$$

$$= \frac{-R_2/R_1}{1 + j\omega R_2 C}$$

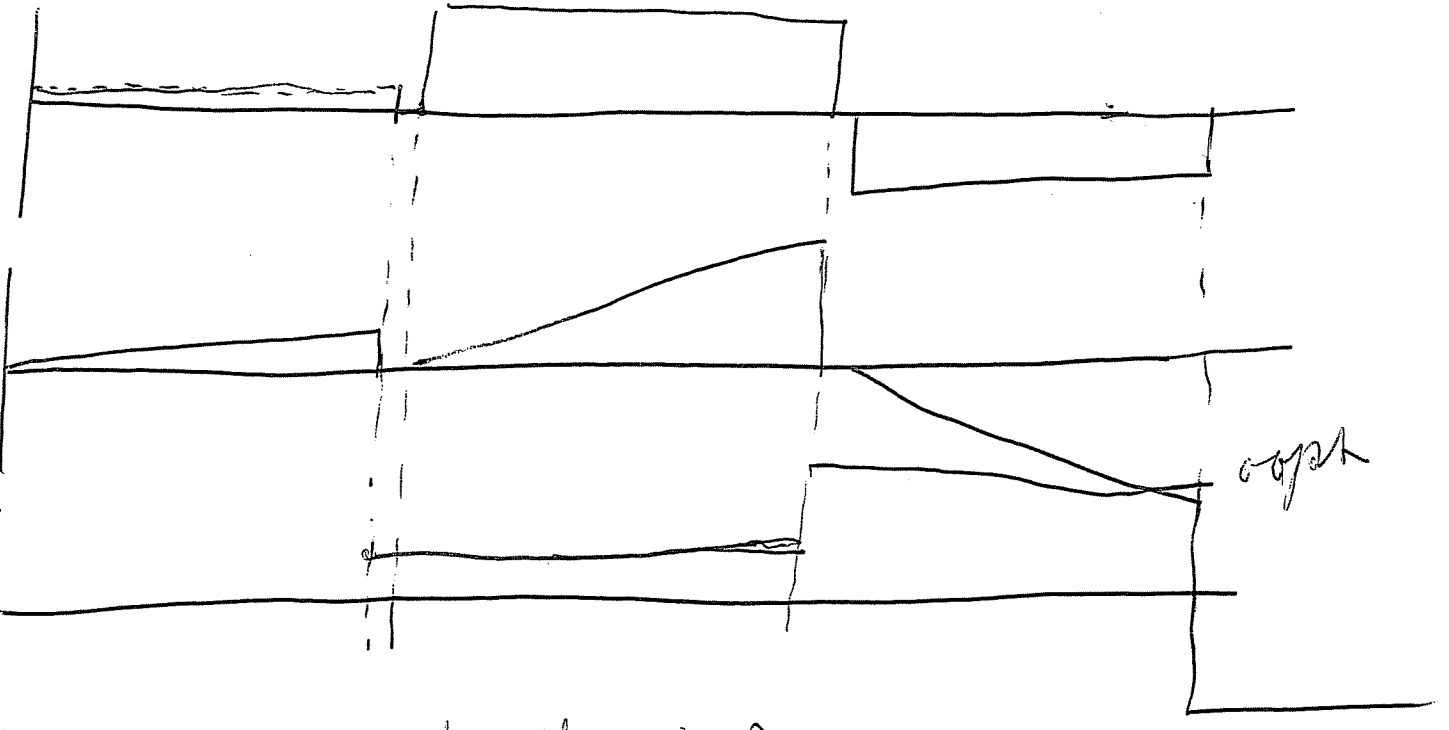
If $R_2 >> R_1$ then

$$H(\omega) \approx \frac{-1}{j\omega R_1 C}$$

Integrate and Dump



EX:



The longer we integrate, the higher the SNR