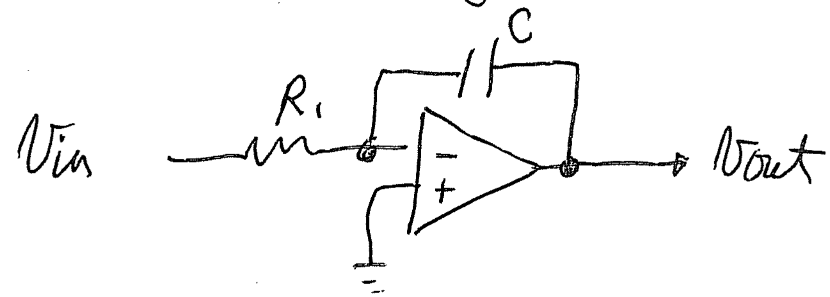
Lecture 14B EE511

Integrate and Dump

Consider an analog integrator

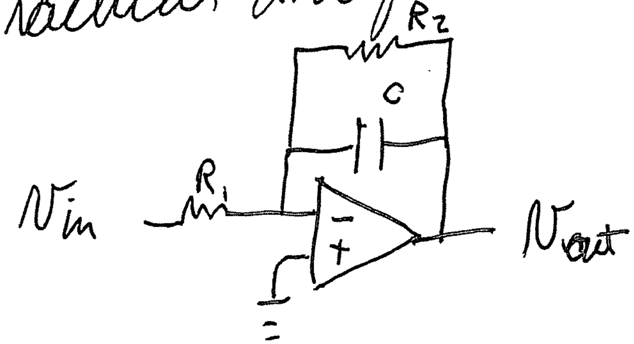


$$\frac{V_{out}}{V_{in}} = -\frac{Z_f}{Z_1} = -\frac{\frac{1}{sC}}{R_1}$$

$$= -\frac{1}{sR_1C} = -\frac{1}{j2\pi fR_1C}$$

$$= -\frac{1}{j2\pi fR_1C}$$

Practical Integrator or Low Pass Filter



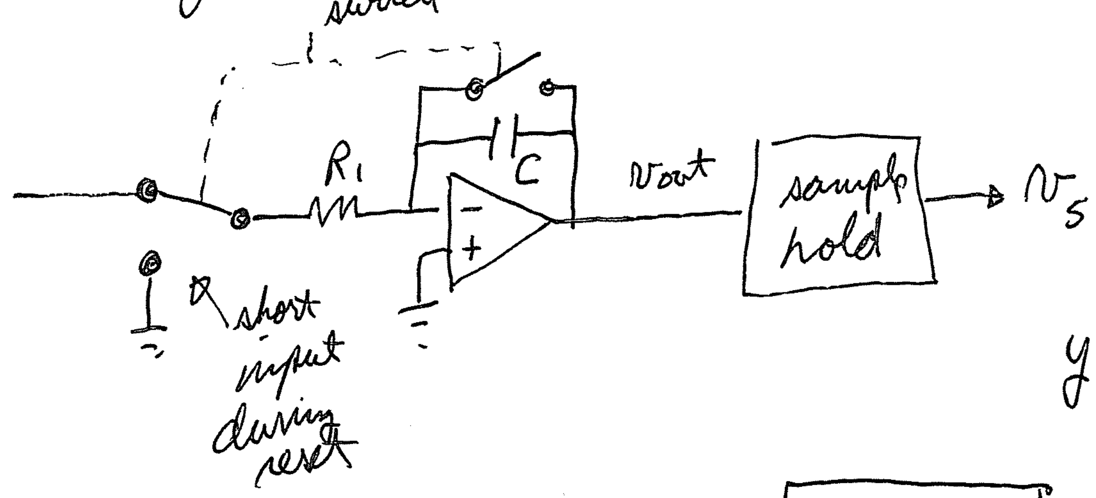
$$V_{out} = -\frac{\frac{R_2/sC}{R_2 + 1/sC}}{R_1}$$

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

If $R_2 >> R_1$ then

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

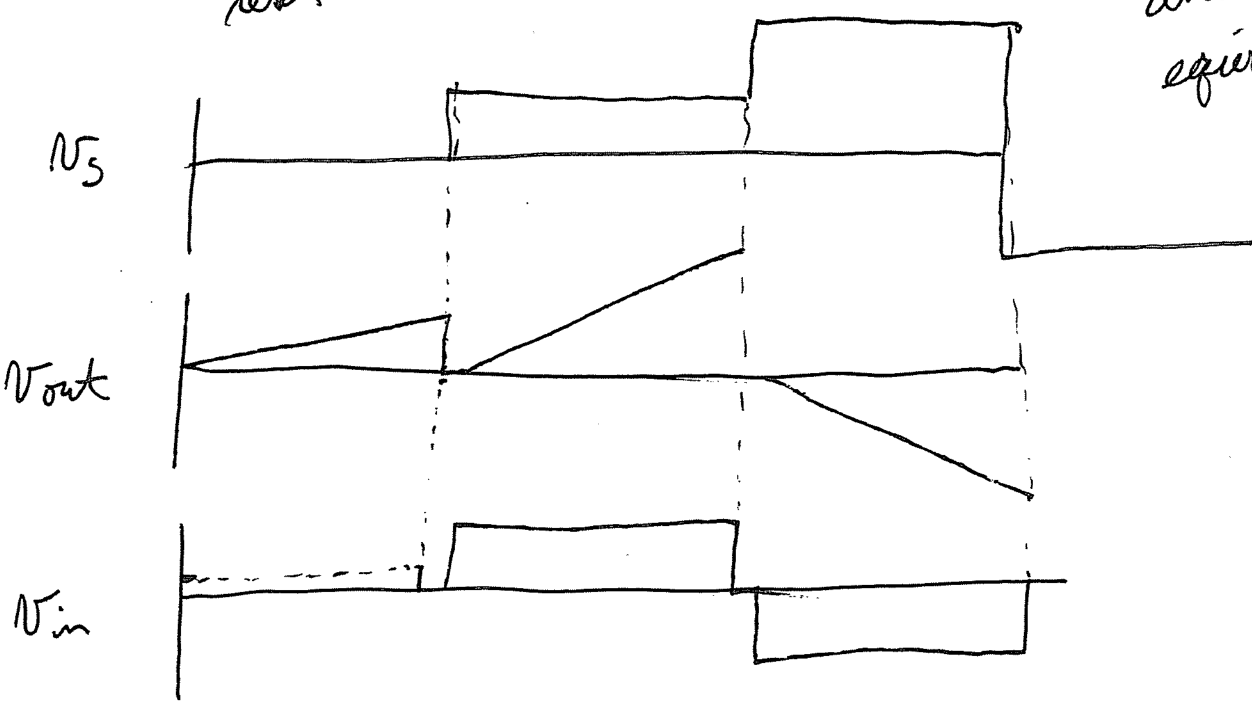
Integrate and dump



$$y_T = \int_0^T g(\lambda)\, d\lambda$$

where y_T is equivalent to v_s

EX:



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255 PCM. Alter-
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ompanded PCM.
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case of DPCM in
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V_c (binary). In this
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eform is illustrated.
e beginning of each
.† Here the integra-
that the integrator

(3–81)

$< 2B_{\text{channel}}$, where B_{in} is
ower limit prevents alias-
er. (See Example 3–5 for

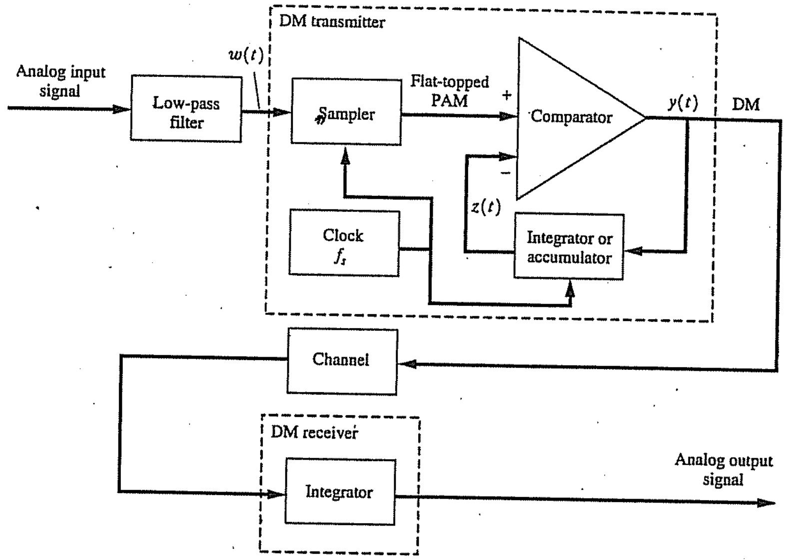

Figure 3–31 DM system.

where $y_i = y(iT_s)$ and δ is the accumulator gain or step size. The corresponding DM output waveform is shown in Fig. 3–32b.

At the receiver, the DM signal may be converted back to an analog signal approximation to the analog signal at the system input. This is accomplished by using an integrator for the receiver that produces a smoothed waveform corresponding to a smoothed version of the accumulator output waveform that is present in the transmitter (Fig. 3–32a).

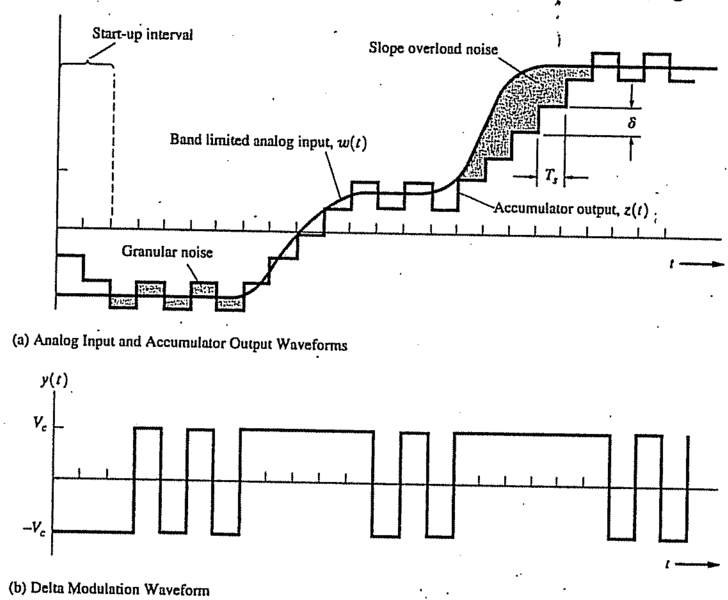

Figure 3–32 DM system waveforms.