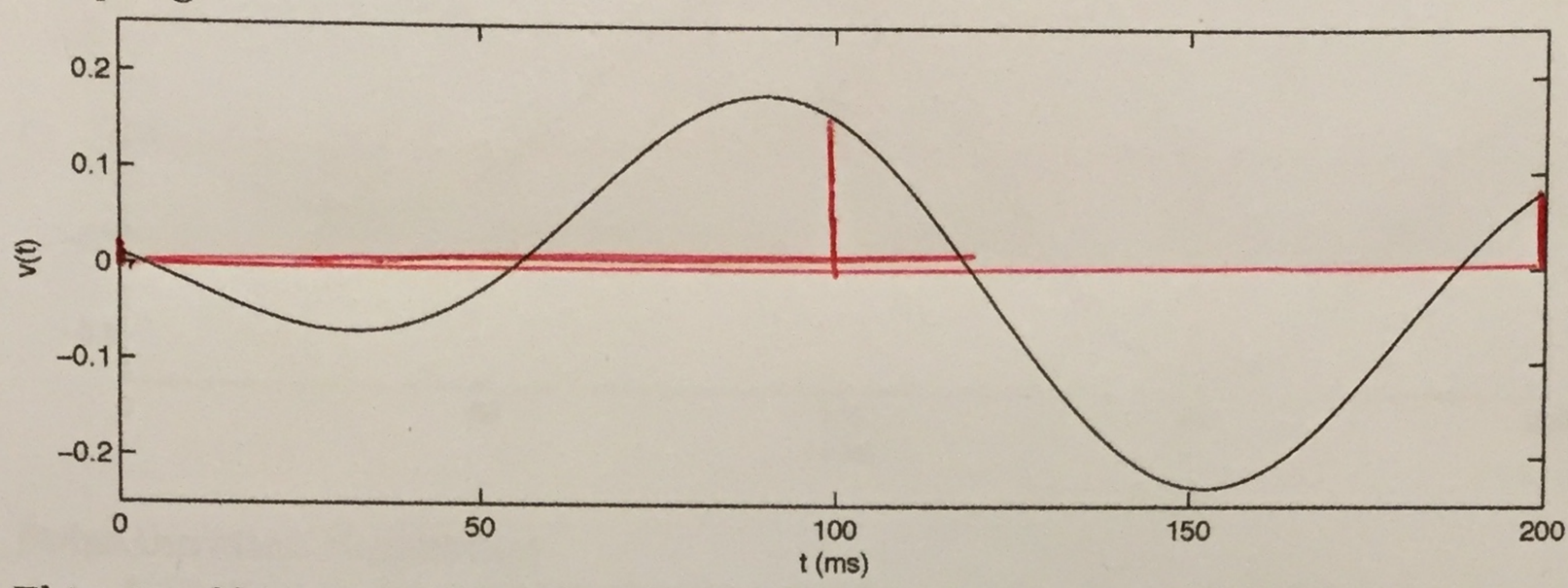
Lecture 11 exercises

1.

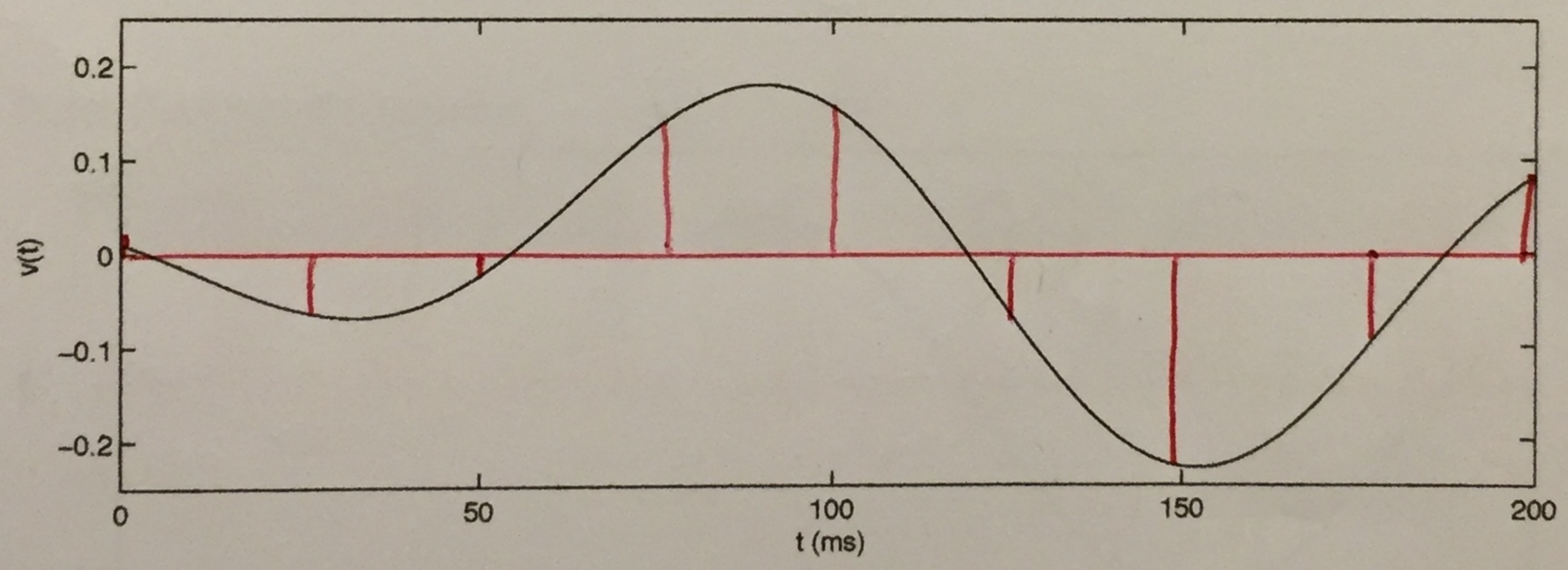
Sampling



This signal has a maximum frequency of about 10 Hz (we can see two cycles in 200 ms, which corresponds to 10 cycles in 1 s). To avoid aliasing, we need a sampling frequency of at least 20 Hz.

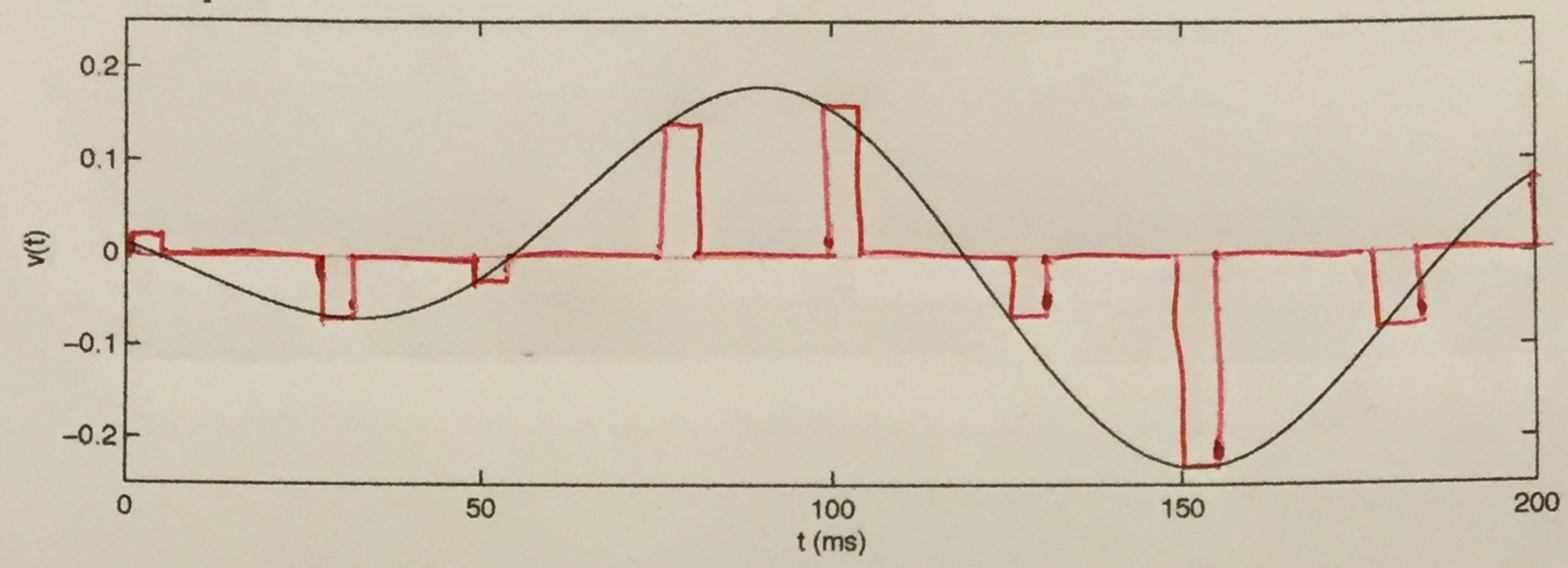
A sampling period of 100 ms corresponds to a sampling frequency of 10 Hz. This will cause aliasing in the sampling of the above signal, since it is below 20 Hz.

A sampling frequency of 40 Hz is high enough to avoid aliasing. This corresponds to a sampling period of 25 ms.

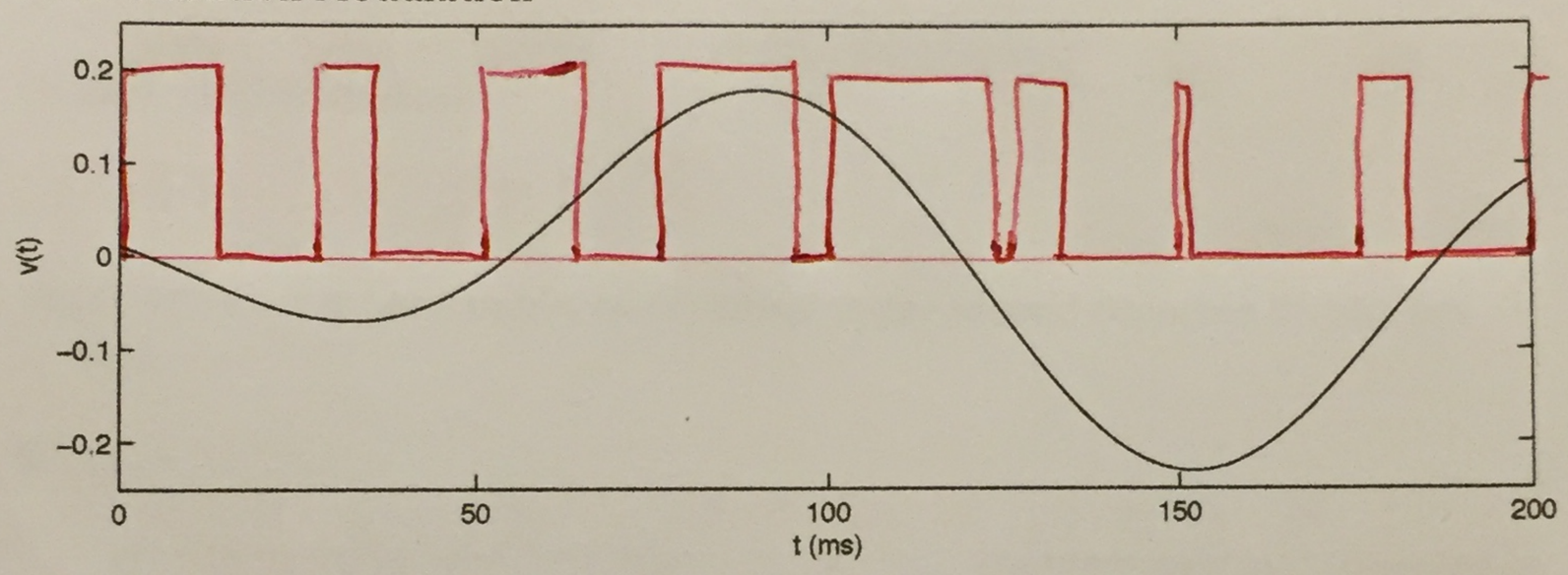


2.

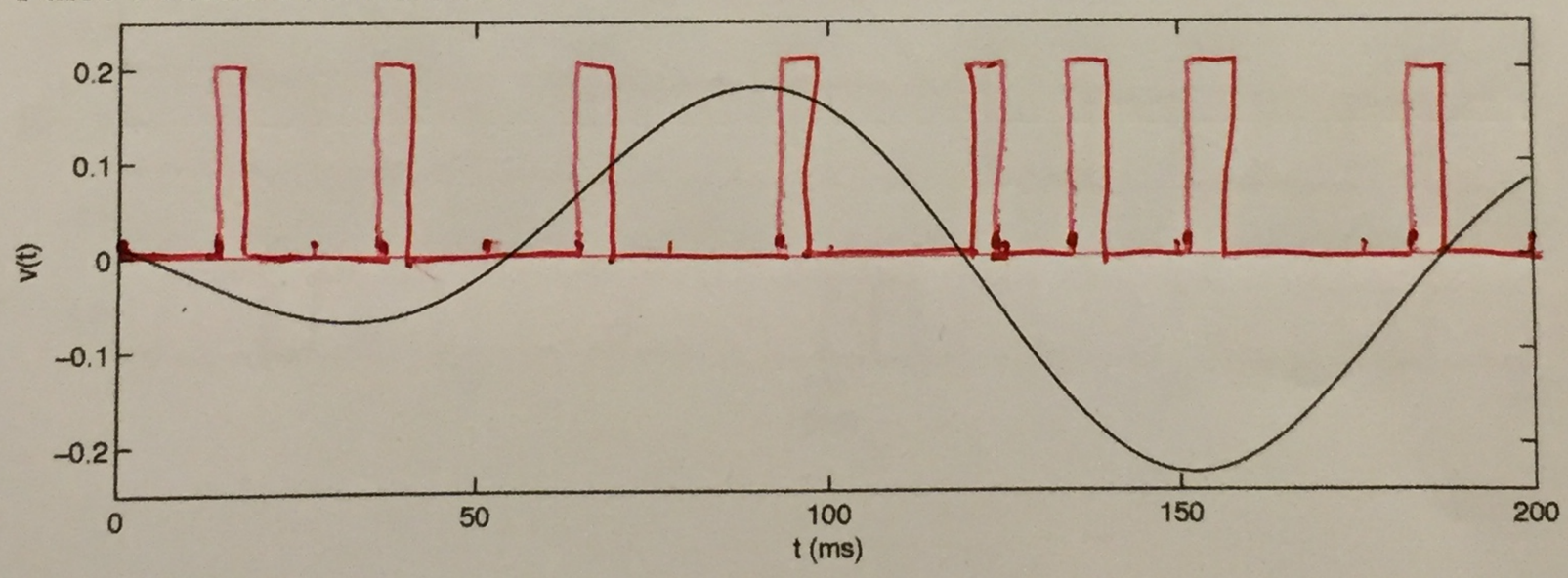
Pulse Amplitude Modulation



Pulse Duration Modulation

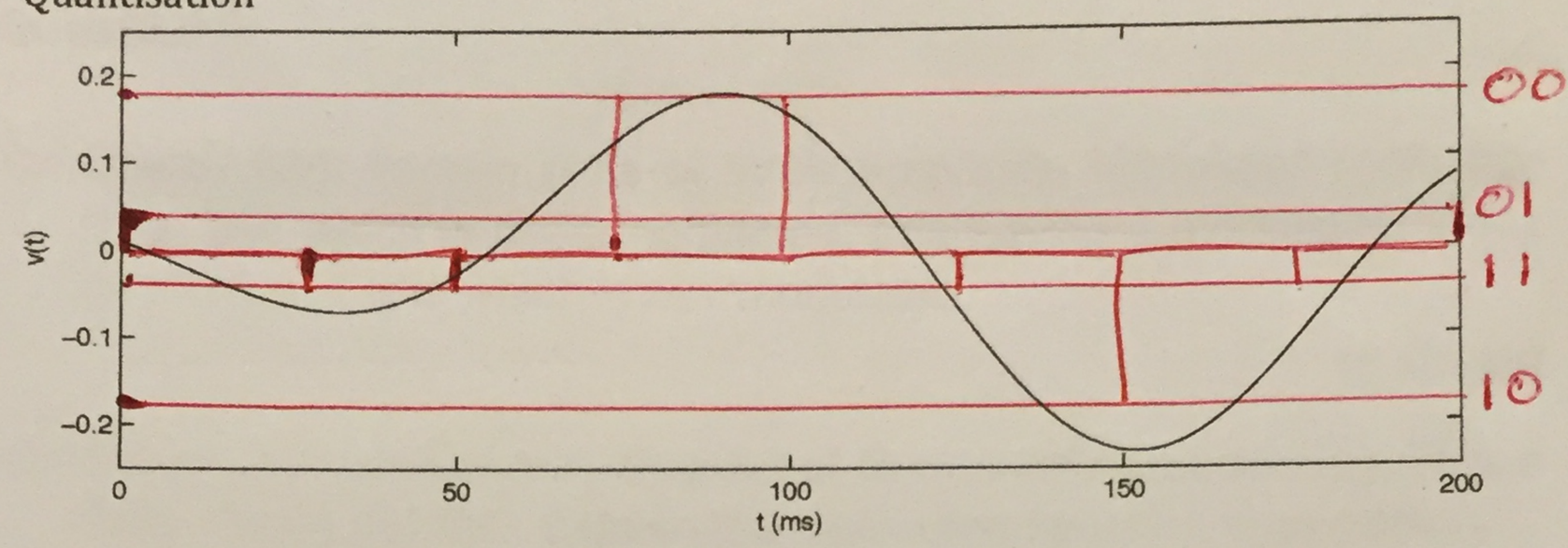


Pulse Position Modulation



3.

Quantisation



4.

Pulse Coded Modulation

01111100001110 11

We have two bits per sample, so 40 samples per second becomes 80 bits per second.

5.