

PHYS 3360 / AEP 3630

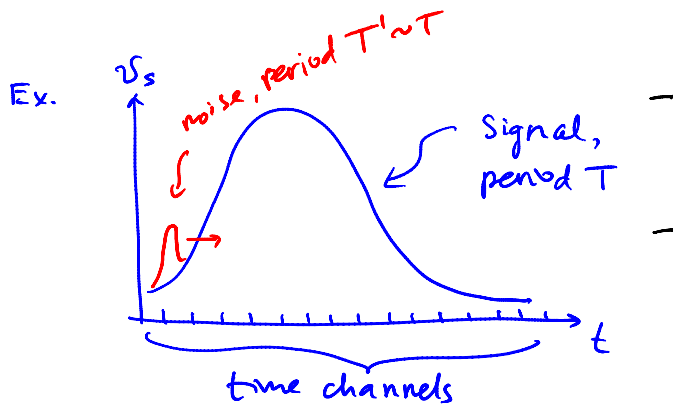
Lecture 42

Detecting signal buried in noise

For poor S/N signal, recovery is often possible

⇒ SNR can be made very large

signal averaging - example of _____



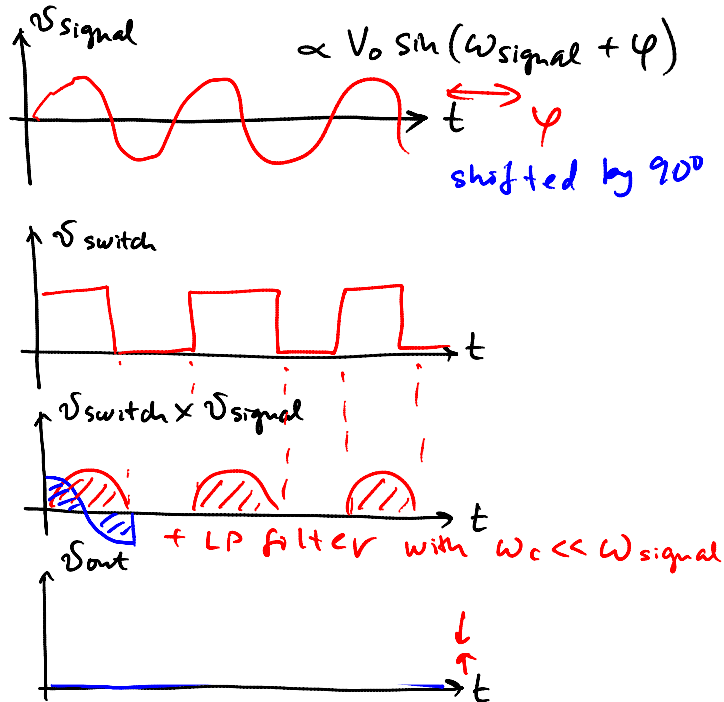
$$SNR_{dB} = 10 \log_{10} \left(\frac{P_s}{P_n} \right)$$

SNR increases 3dB for each _____

Lock-in amplification

- most signals can be made repetitive
- if signal can be addl. made periodic, can use lock-in amp

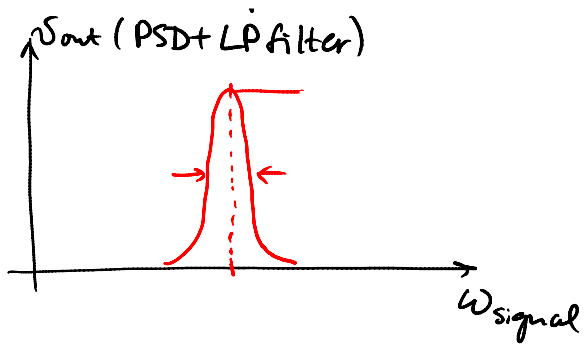
Phase sensitive detector:



Lock-in amp

- 1) system response signal of interest V_0
- 2) PSD:

3) LP filter after PSD



Application Example

you are measuring a very weak signal, e.g.

fluorescence

