

8-2-2022

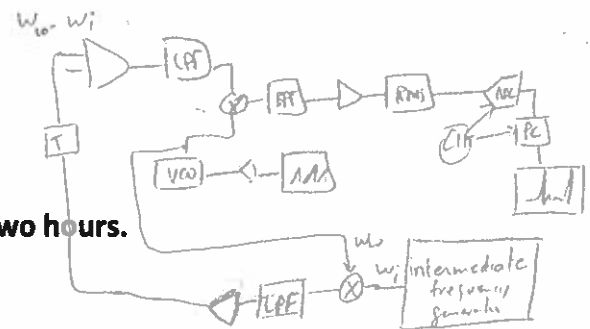
Measurements and Instrumentations for TLCs.

$$V = \frac{m}{s}$$

dist.
speed of light

Answer the following questions in an explanatory way to prove your knowledge of the different matters.

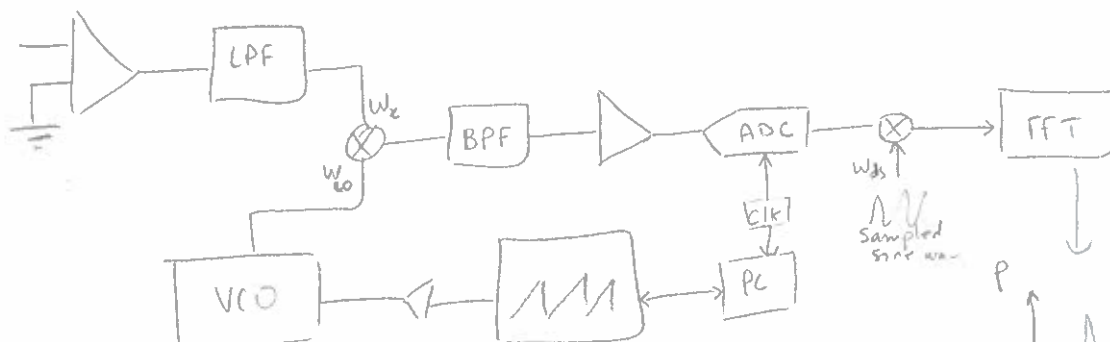
- 1) Draw the scheme and derive the input/output characteristic of an analog integrator based on the use of an operational amplifier. In case the design signal bandwidth is equal to 1 MHz give an estimation of the noise equivalent bandwidth of the circuit. $BW_n = \frac{F}{2} f_c$
- 2) Draw the block schematic of a real-time spectrum analyzer. Explain the principle of operation of the instrument.
- 3) Which signals can be used by a network analyzer to stimulate the device under test during the measurement of its transfer function? Explain advantages and limitations of the different signals. difference $(\omega_o - \omega_i)$
- 4) Explain why the distance resolution of an OTDR is dependent on the time duration of the light pulses used by the instrument to carry out the measurement.
- 5) If we want to measure the total optical power emitted by an LED, is the electronic power meter based on a photodiode light sensor the right instruments to use? Both in case your answer is YES or NO elucidate in a detailed way your arguments supporting the answer.



→ combination of heterodyne + FFT

The total available time is two hours.

→ real time
→ any BW location position



select narrow bands of the signal independently and then use the FFT to calculate and display it in the freq. domain.

signal mixed with a sine wave from the local oscillator. then, divided into narrowbands using BPF

