K-type thermocouple

Naneng 203: electric circuit

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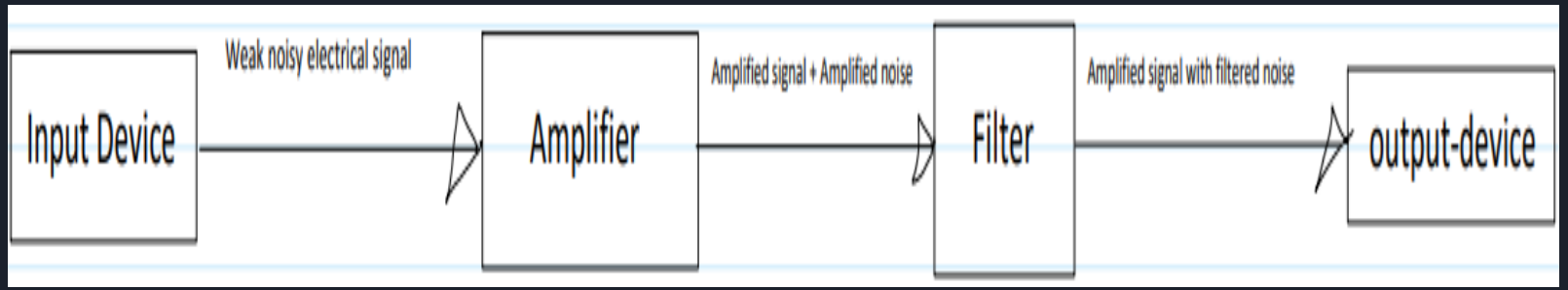
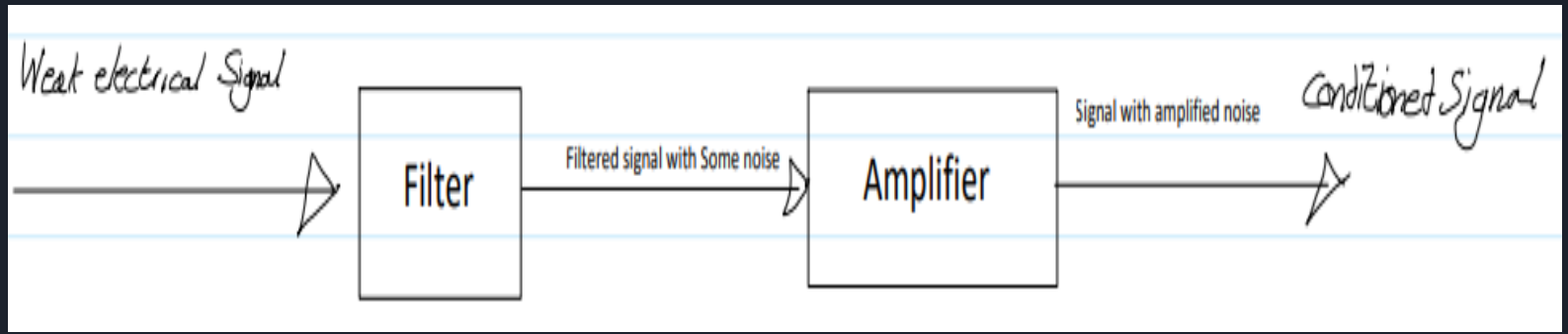
Intro

problem : measuring temperature accurately as thermocouple produce small voltage signals and may exhibit smaller voltage changes with temperature.

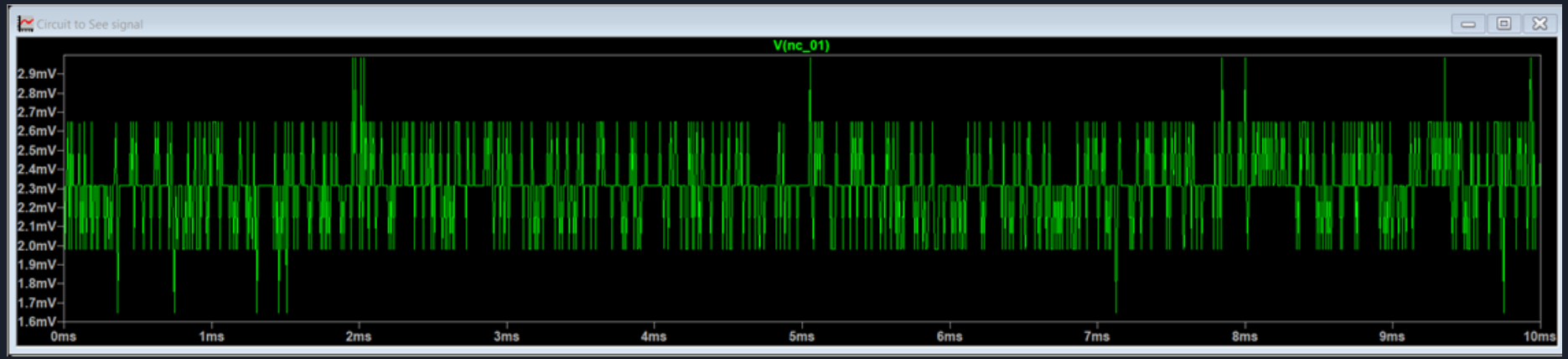
Solution: low-pass filter





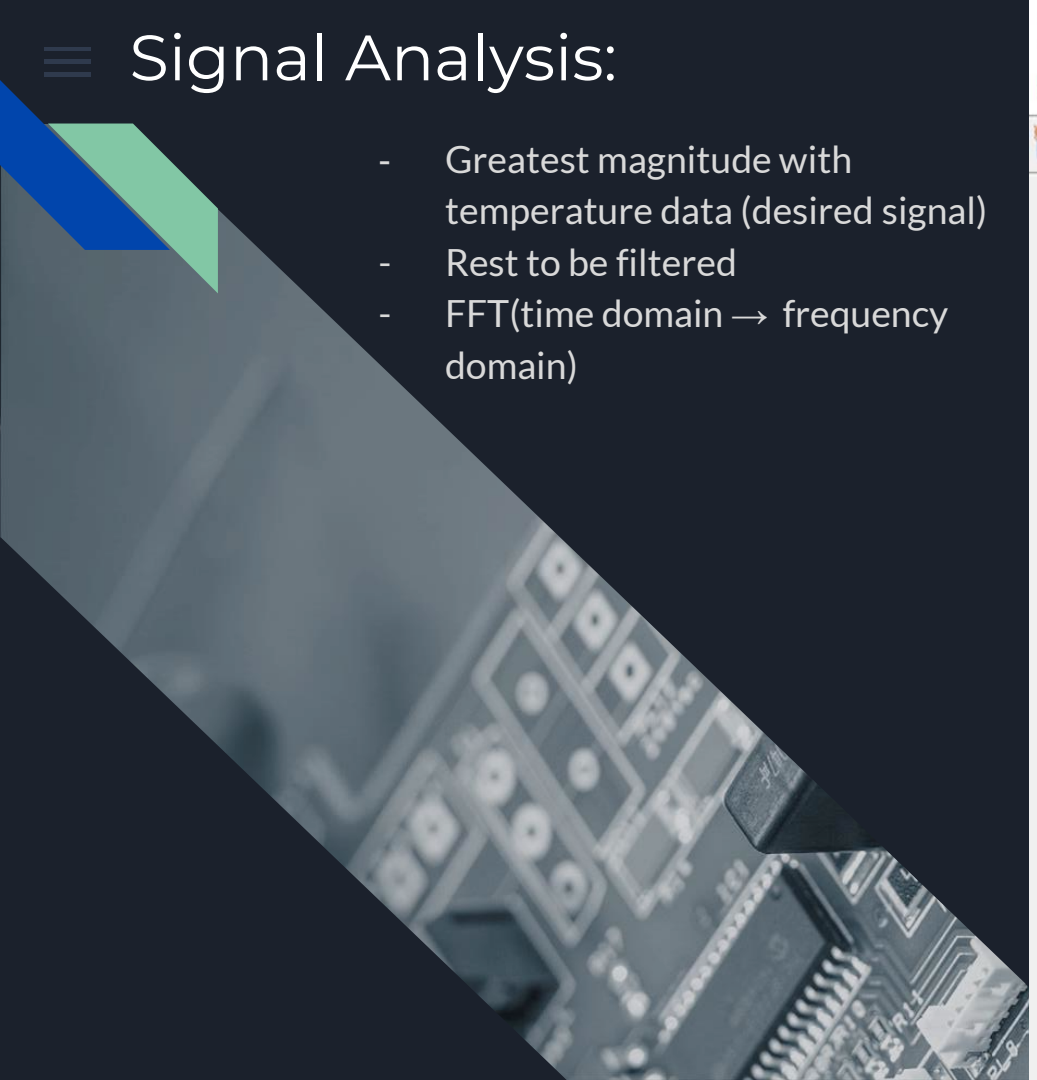
Acquiring the signal and displaying it:

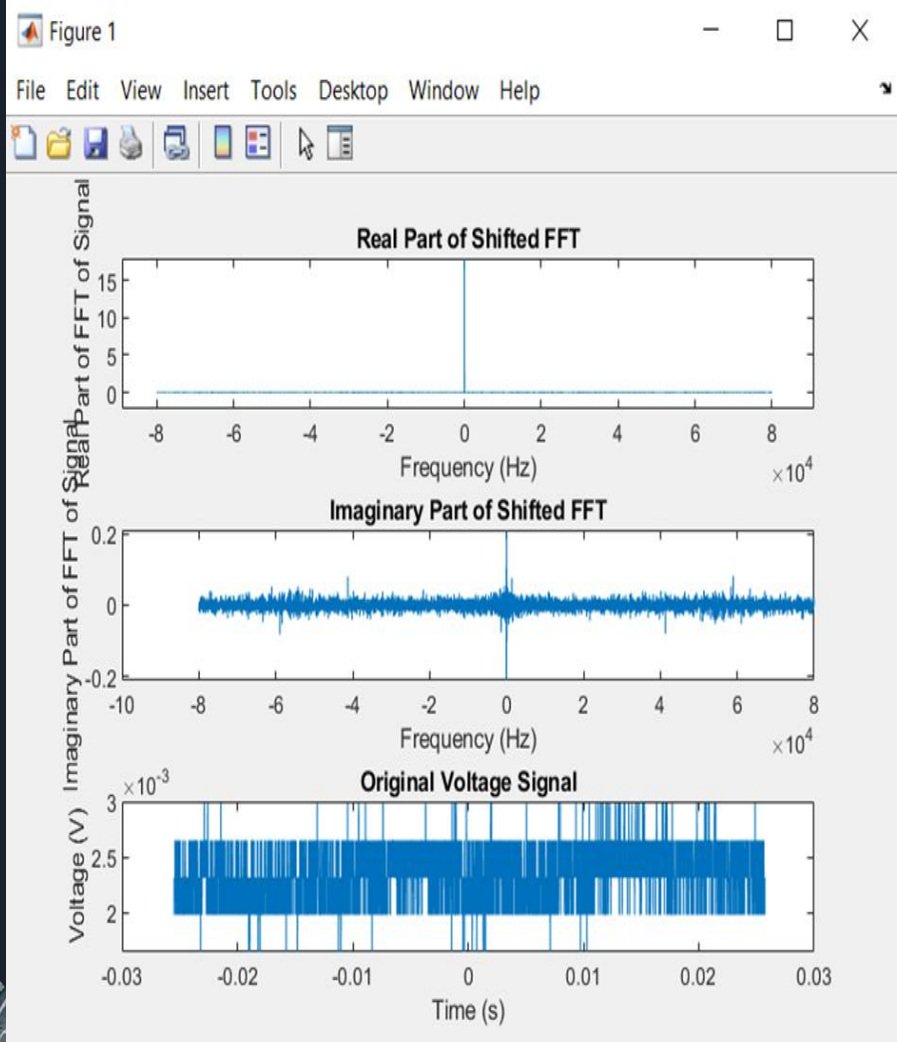
- Analog discovery
- Thermocouple
- Very low voltage, about 2.6 mV.



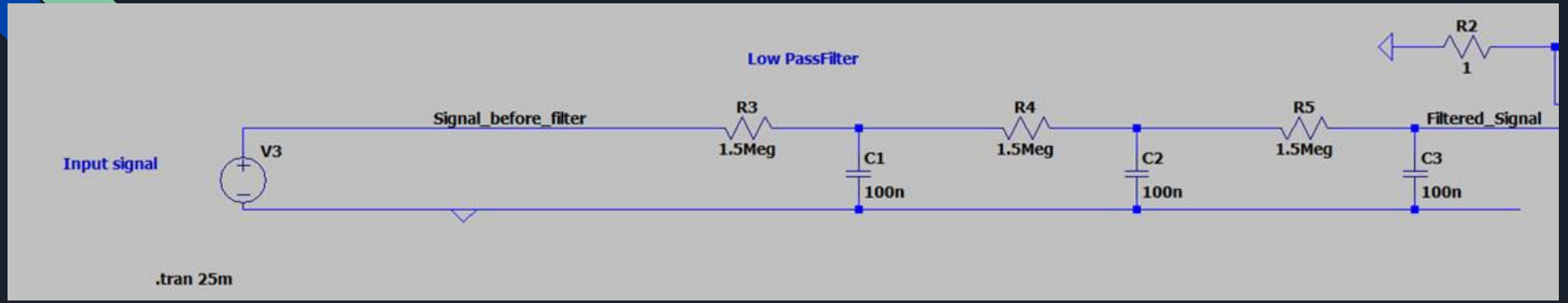
Signal Analysis:

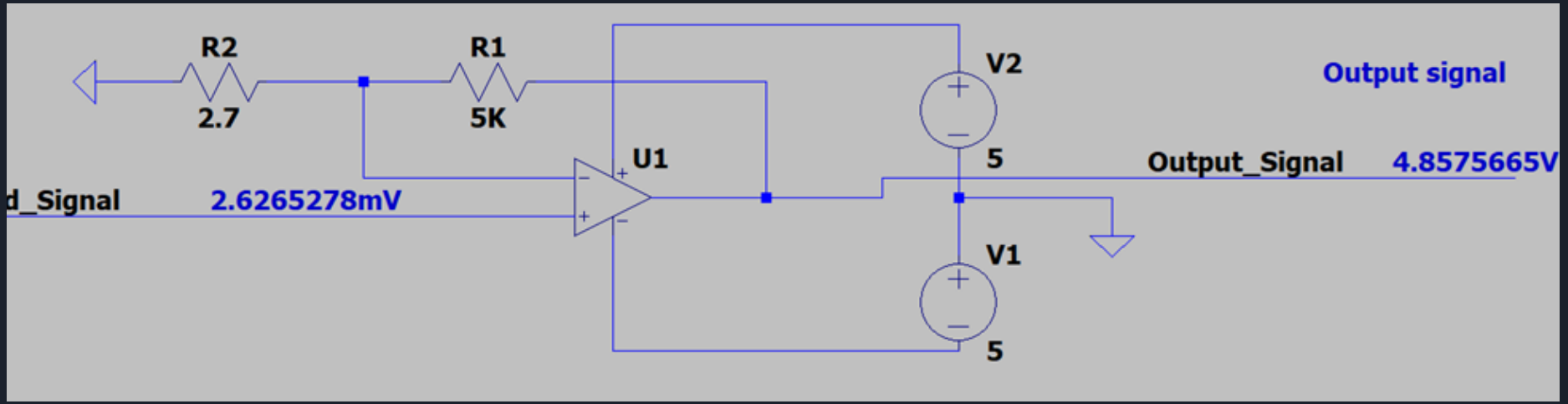
- Greatest magnitude with temperature data (desired signal)
- Rest to be filtered
- FFT(time domain → frequency domain)



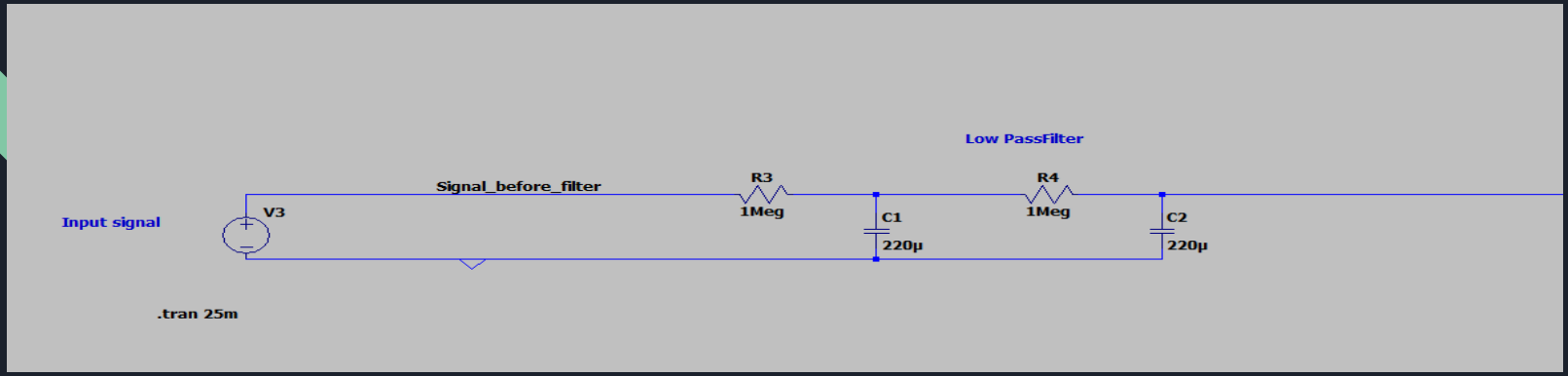


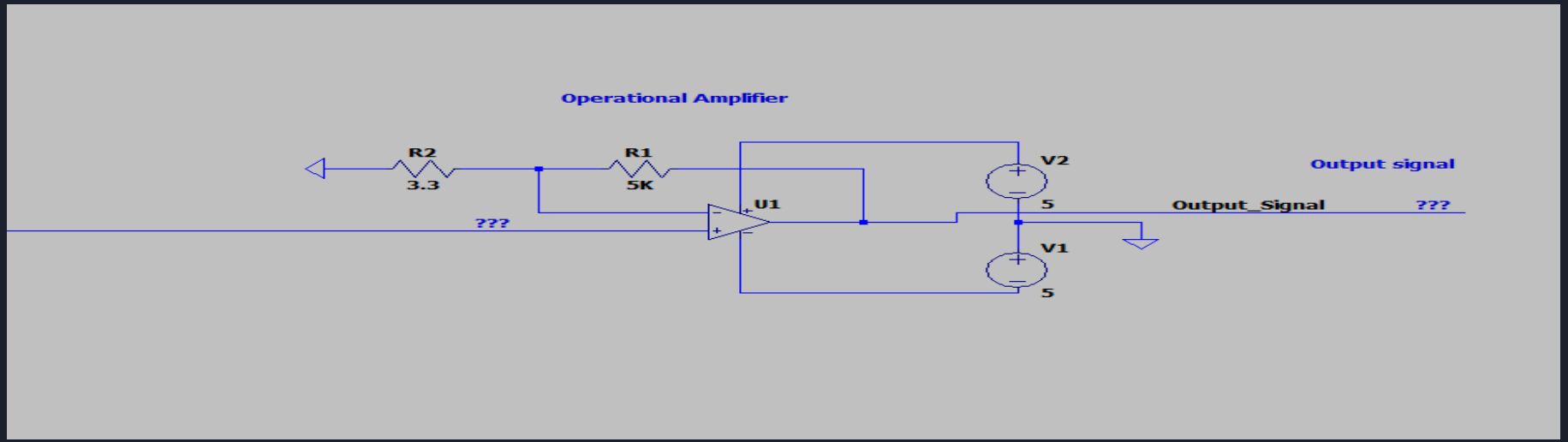
Circuit design#1:



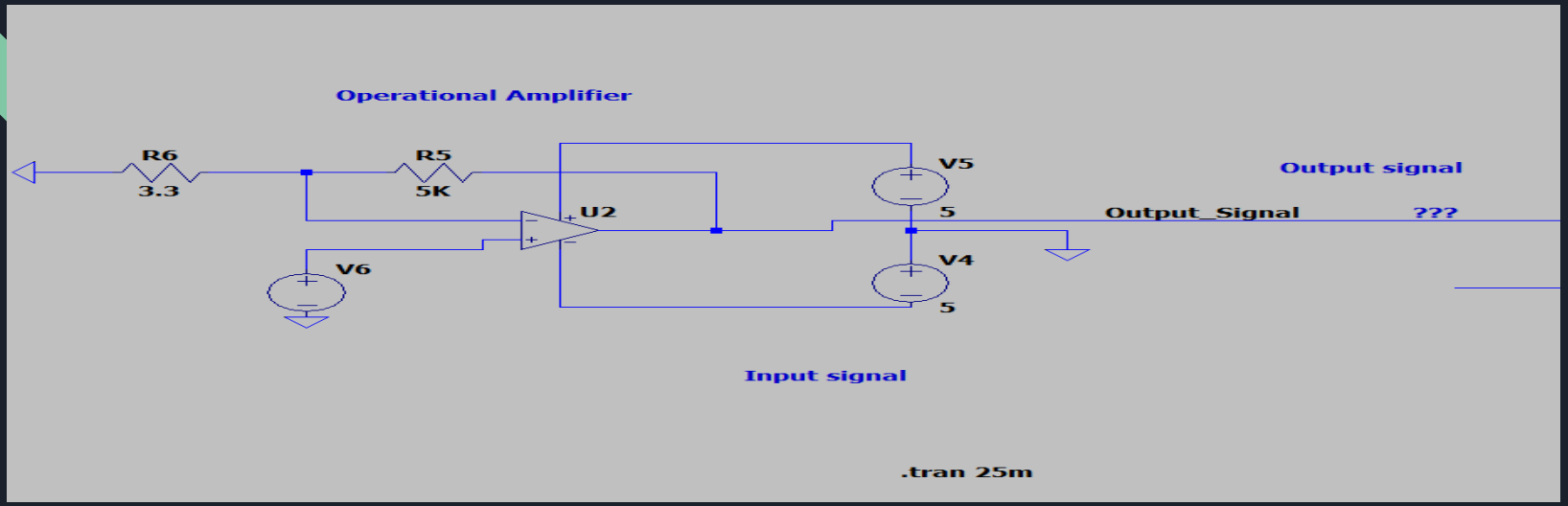


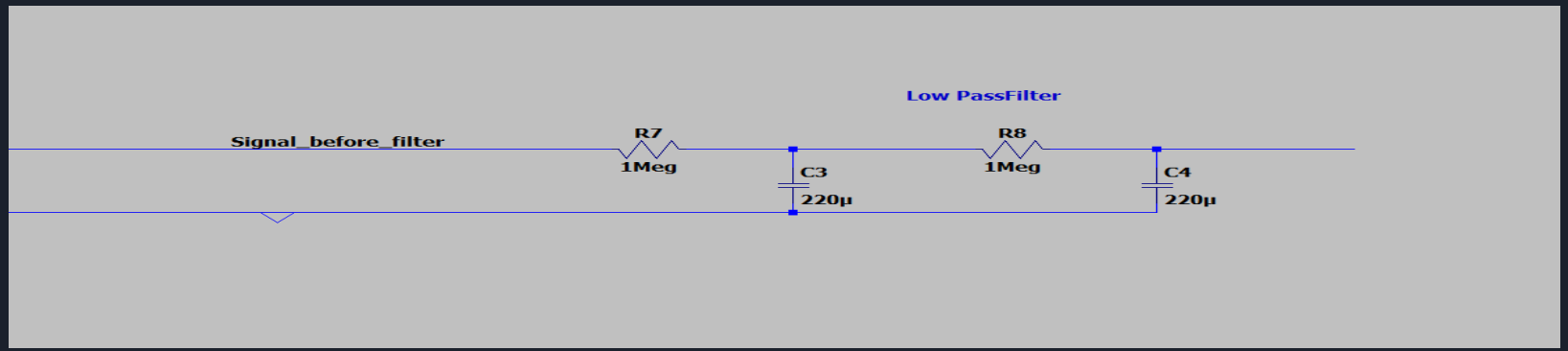
Circuit design#2:



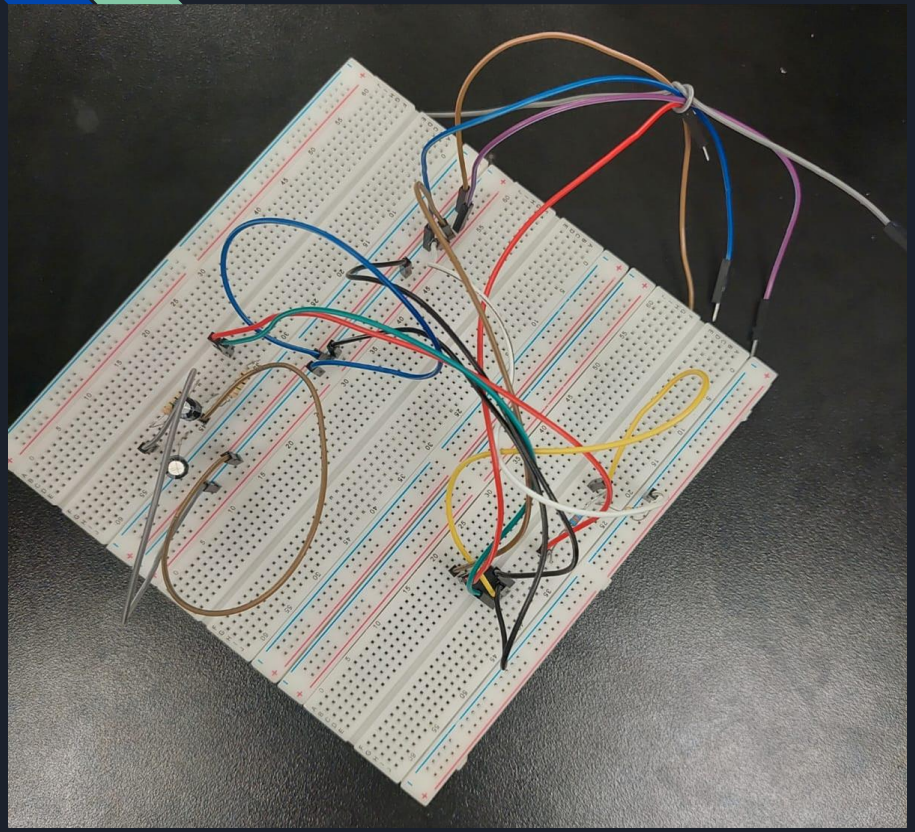


Circuit design#3:

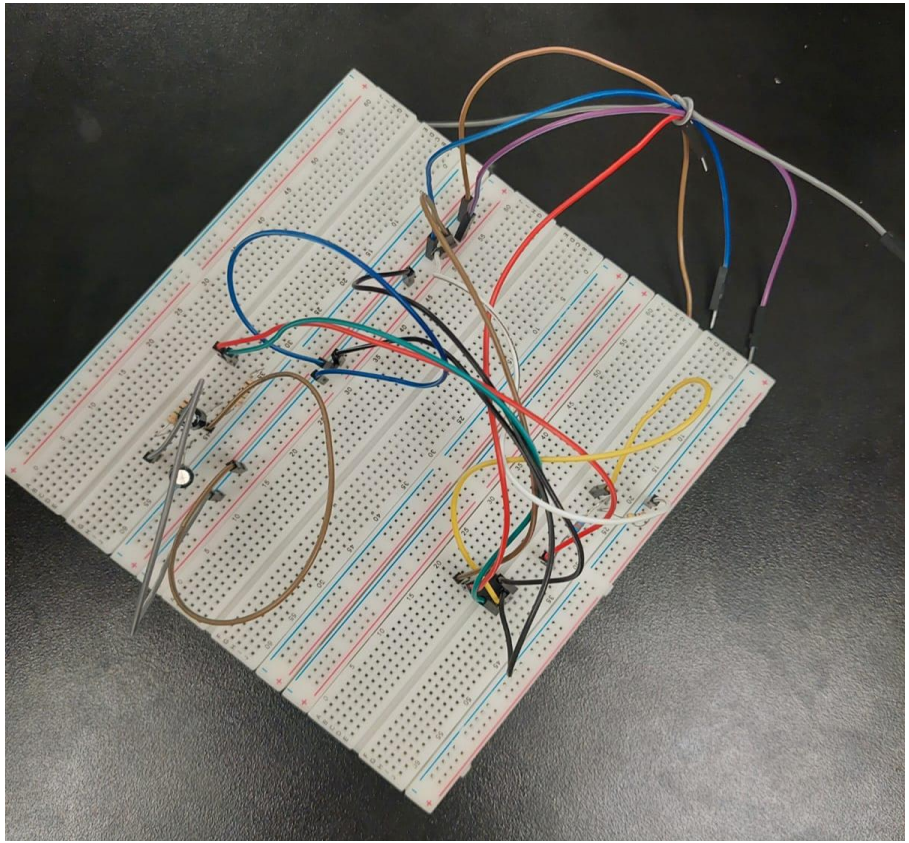




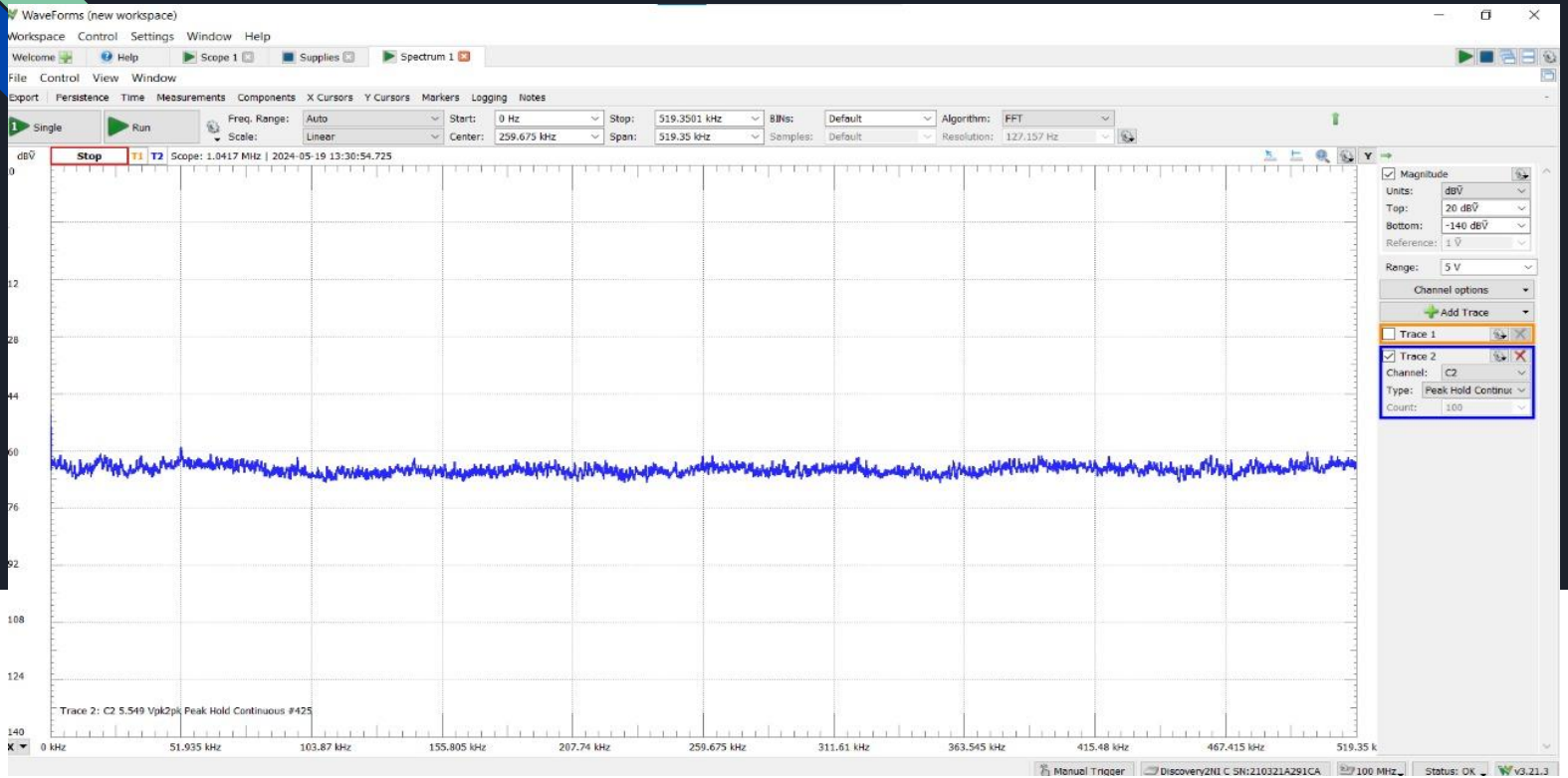
Circuit



Design



Spectrum of signal:



“Input signal”

Spectrum of signal:

“Amplified signal ”

Spectrum of signal:

“output signal(after amplification and filtration)”

Spectrum of signal:

“Input signal vs. Output signal ”

Thank you