**MATLAB PROJECT**

Using MATLAB, each group (*max. 4 students*) writes a program to design an assigned filter:

| **Topic** | **1** | **2** | **3** | **4** | **5** |
| --- | --- | --- | --- | --- | --- |
| Filter | FIR - LPF & Notch filter | FIR - HPF & Comb filter | FIR - BPF & Butterworth filter | FIR - BSF & Chebyshev  type 1 filter | FIR - LPF & Chebyshev  type 2 filter |
| **Topic** | **6** | **7** | **8** | **9** | **10** |
| Filter | FIR -HPF & Elliptic filter | FIR - BPF & Notch filter | FIR - BSF & Comb filter | FIR - LPF & Butterworth filter | FIR - HPF & Chebyshev  type 1 filter |
| **Topic** | **11** | **12** | **13** | **14** | **15** |
| Filter | FIR - BPF & Chebyshev  type 2 filter | FIR - BSF & Elliptic filter | FIR - LPF & Notch filter | FIR - HPF & Comb filter | FIR - BPF & Butterworth filter |
| **Topic** | **16** | **17** | **18** | **19** | **20** |
| Filter | FIR - BSF & Chebyshev  type 1 filter | FIR - LPF & Chebyshev  type 2 filter | FIR - HPF & Elliptic filter | FIR - BPF & Notch filter | FIR - BSF & Comb filter |

Topic registration at:

https://docs.google.com/forms/d/e/1FAIpQLSfraebU-nNUUA9voZQRMXnbBDO2m3NmM1gcmMOZuRR5PcM2Yw/viewform

*Note: You are not allowed to register a topic already registered by other groups. Check here:*

[*https://docs.google.com/spreadsheets/d/1VgOAKx1Ry5joLDsU52Tuv\_sNHARv3vglQhlwehl5L8s/edit?usp=sharing*](https://docs.google.com/spreadsheets/d/1VgOAKx1Ry5joLDsU52Tuv_sNHARv3vglQhlwehl5L8s/edit?usp=sharing)

- Inputs: FIR or IIR filter and corresponding parameters: filter type (LPF & HPF & …), order of the filter, window name (Rectangular, Hann…), Butterworth, Chebyshev,… - Outputs: Coefficients of filter and Frequency response of the designed filter.

**Requirements:**

- *Theory:*

o *Frequency response, pole-zero plot,*

o *Applications of the corresponding filter,*

o *…*

- *Simulation:*

o *Define the parameters for filter design,*

o *Procedure to design the corresponding filter with the user-defined parameters,* o *Plot Frequency response, pole-zero plot the designed filter,*

o *Plot the first 500 points of impulse response h[n],*

o *Generate some input signals and use the designed filter to filter the generated input signals. Observe the output signals of the filter and comment on them*

- *Write the report (.docx file) + present the project*

- *Submit a report and MATLAB files to elearning by Apr 30th, 2024*