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EXPERIMENT 5. DECIMATION, INTERPOLATION AND PHASE-LOCKED LOOP

PART 2

LABORATORY REPORT

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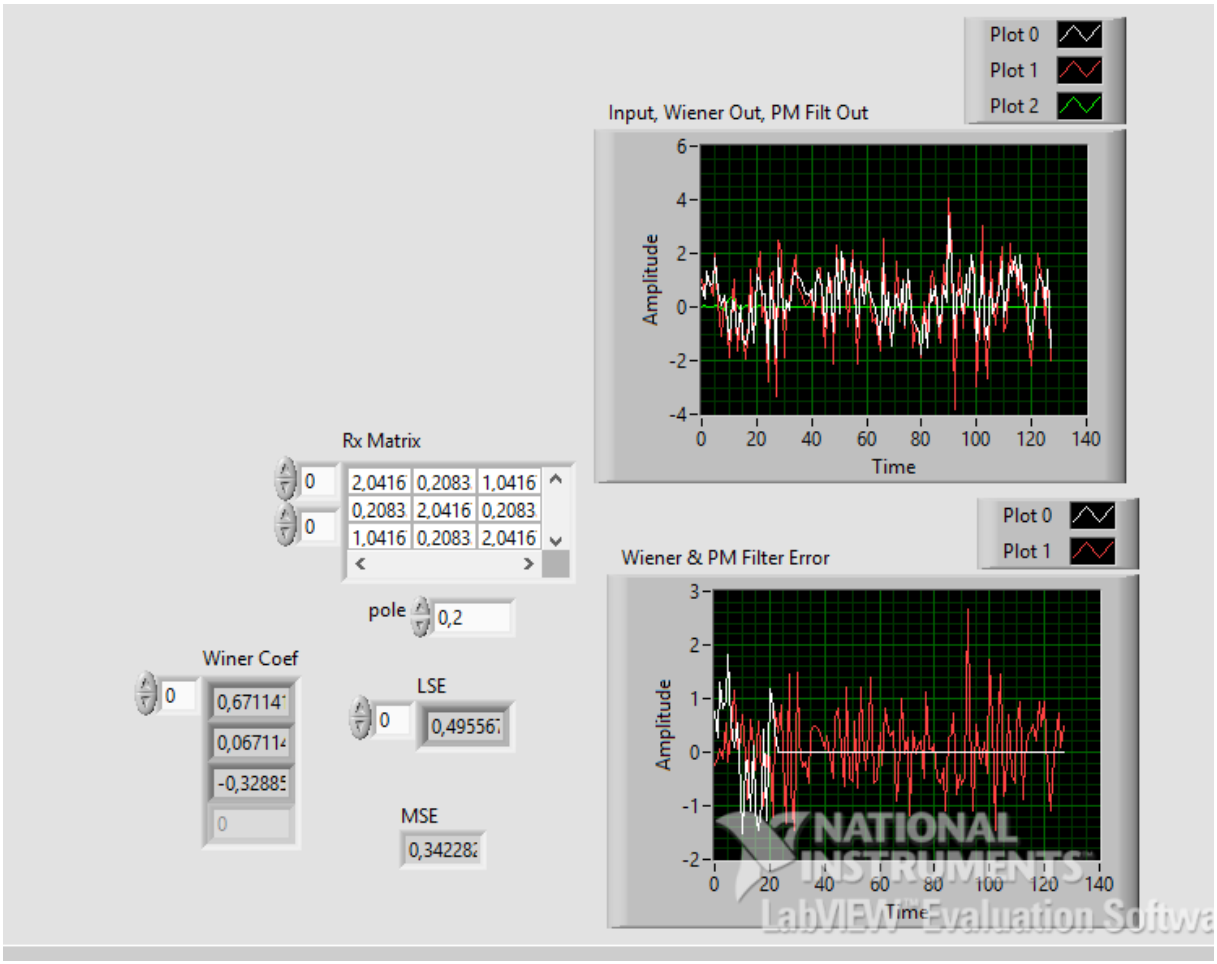
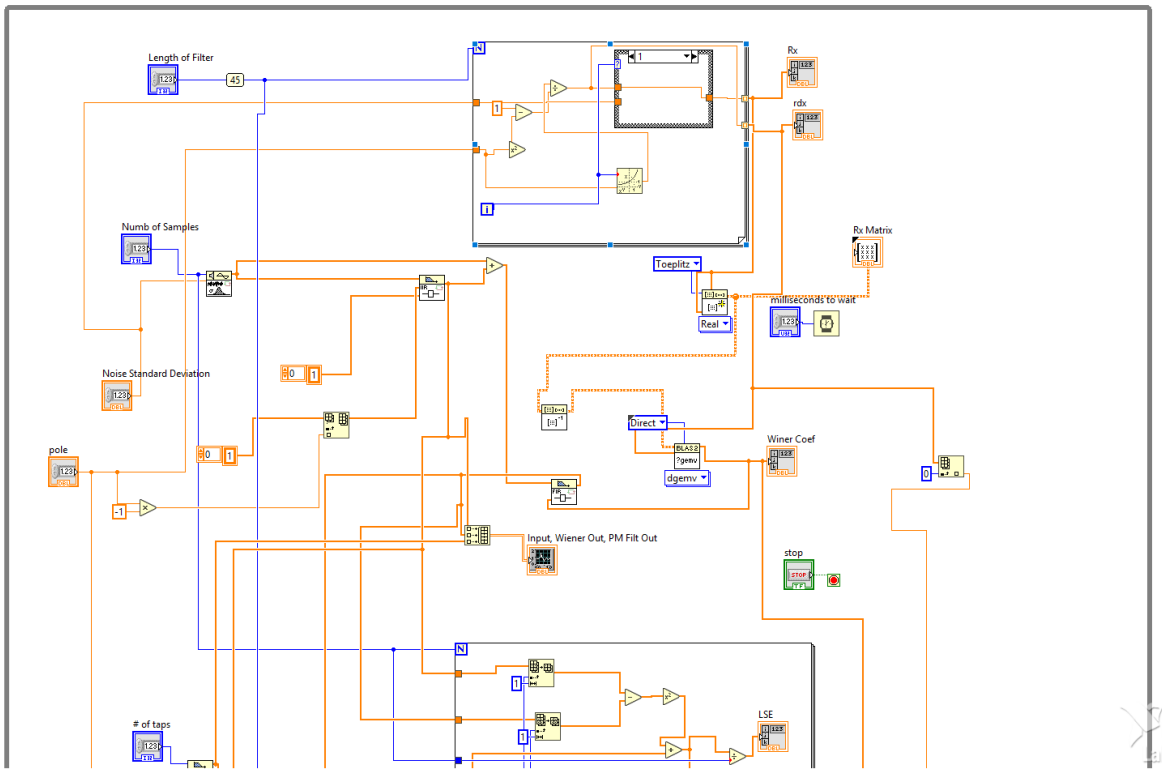
We had some problems with the labView(stucked for loop and wrong inverse matrix operation). However, we couldn't solve them, and also things got worse. At the beginning, we obtained correct autocorrelation matrix but the matrix inverse operation was problematic. After trying different solutions and blocks we couldn't solve it; moreover, all the coefficient collapsed.

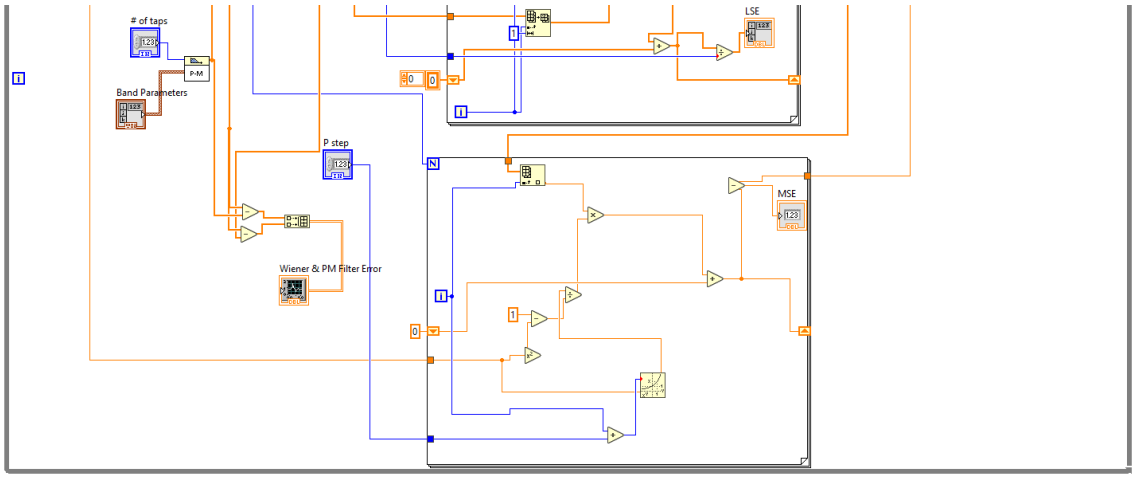
Programming Tasks

a) In addition to the two plots in Fig. 3, add two plots for the frequency characteristics of the Wiener filter and PM filter.

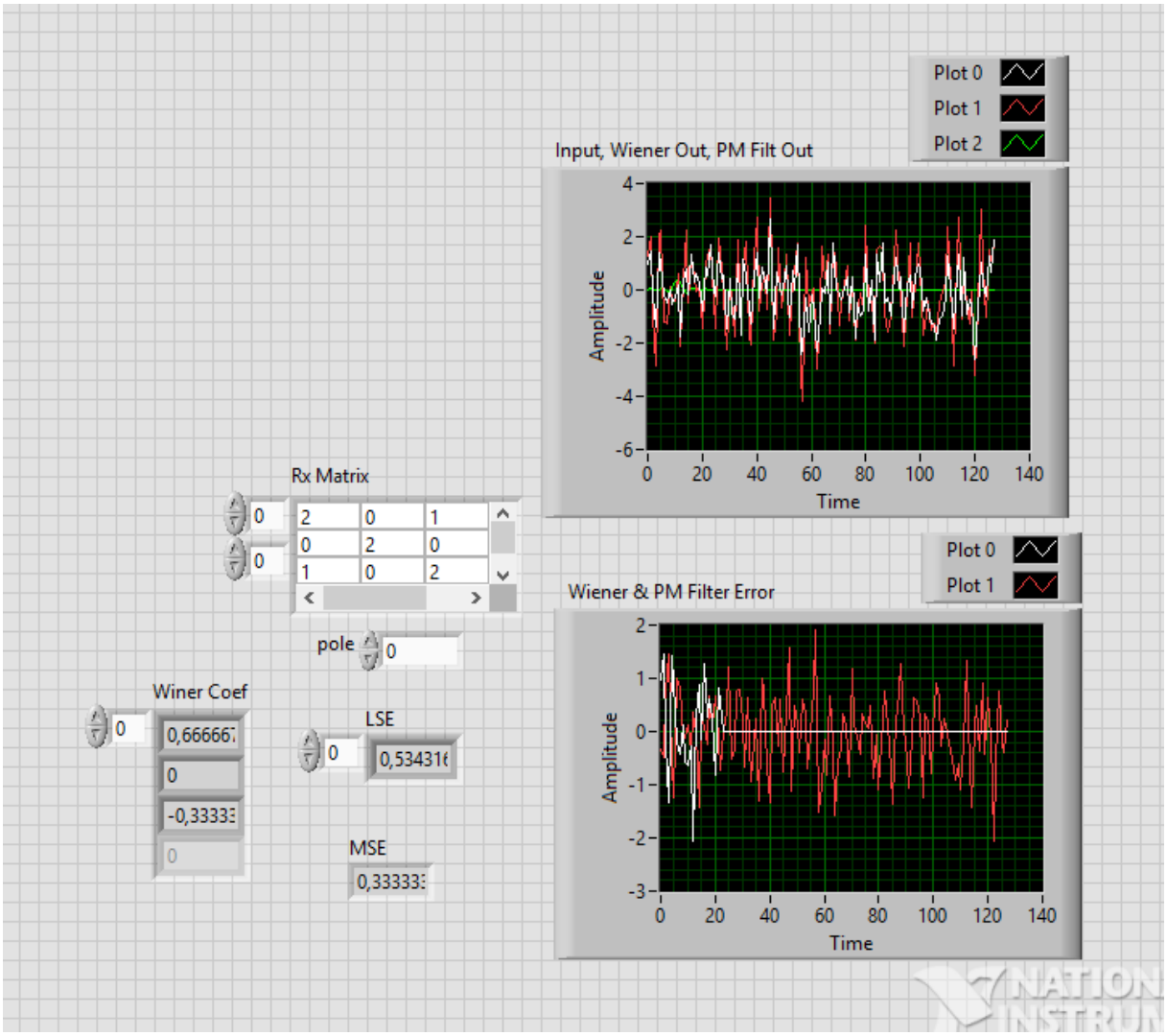


b) Attach below a screenshot of your block diagram.



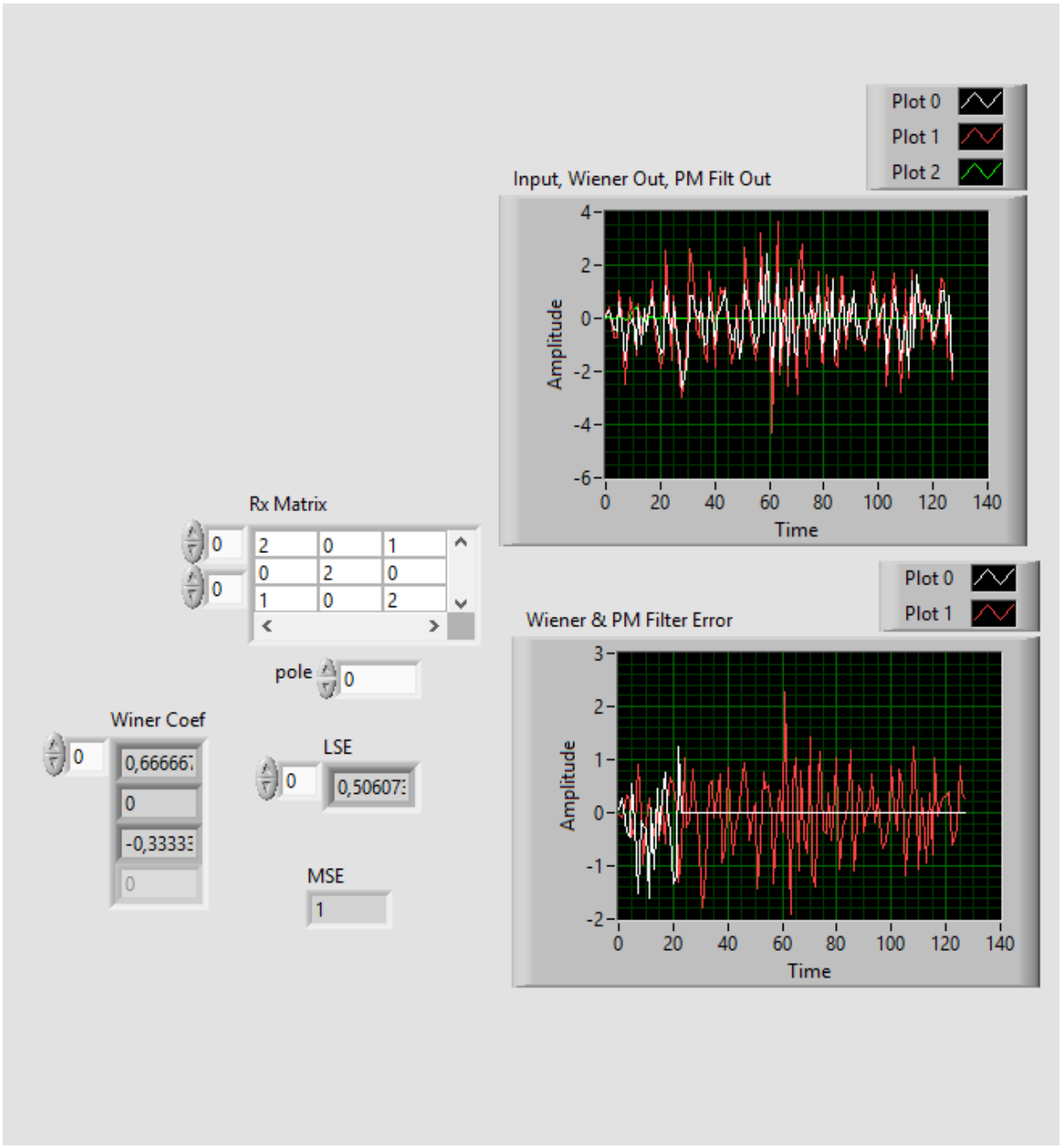


c) Let the innovations process pole, **a=0.8**, **Wiener filter length=3** and **Pstep=0**. Obtain and note the **filter coefficients**, **MSE and LSE values** in your **report**. Also **include** the **waveform plots in your report**. Can you design a PM filter which gives better LSE than Wiener filter?



Theoretically, we cannot design any better filter with better LSE value.

d) Let **Pstep=2** and **repeat c**. **Explain** the **differences** between the results obtained in **c and d.**



With the increased Pstep, we obtained worse LSE and MSE.

e) Increase Pstep to 100. Explain your observations.

Due to the previous problems that we mentioned before, we couldn't obtained any logical result. However, we were expecting significantly higher LSE & MSE due to decrease in the autocorrelation.

f) Now increase the length of the Wiener filter one by one by noting the MSE. Explain the MSE result as the filter length increases.

Again, the results were not worthy to add here. However, we were expecting a better LSE & MSE values. After a certain point, increasing the length of filter coefficient shouldn't be effective after the optimum amount of coefficients is used.