

# **CPE 3500**

## **Embedded Digital Signal Processing**

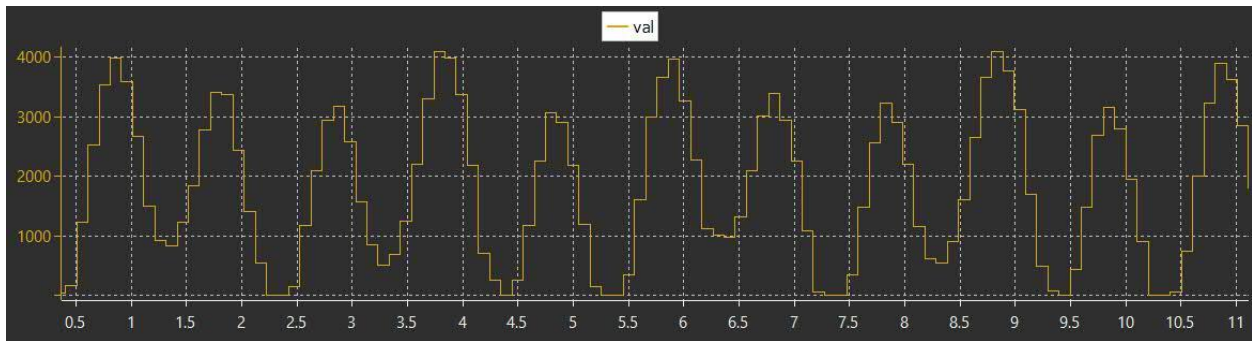
### **Lab 4: Analog to Digital Conversion using ADC and DMA**

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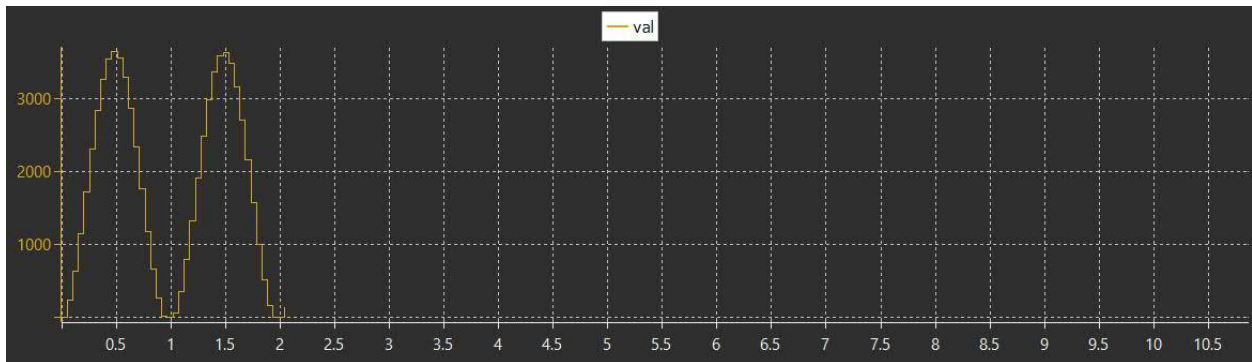
**09/24/2024**

- Task-1:

This is the SWV window before delay.



This is SWV after the delay for 1Hz

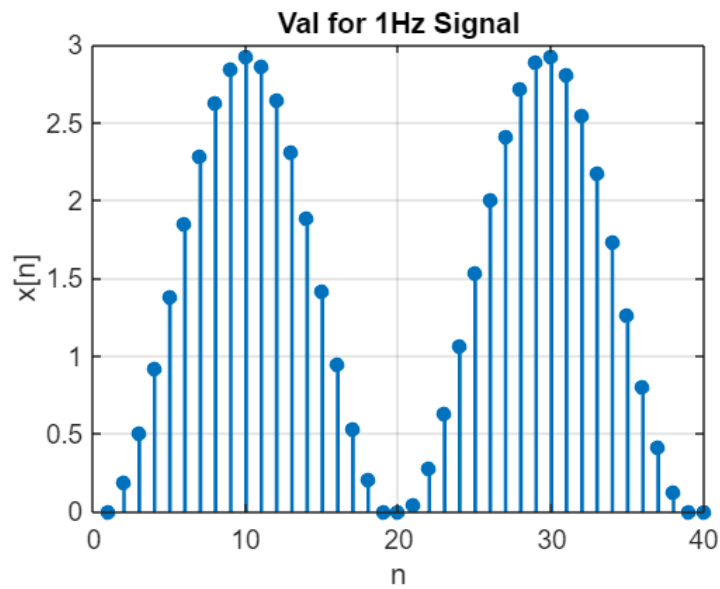


```

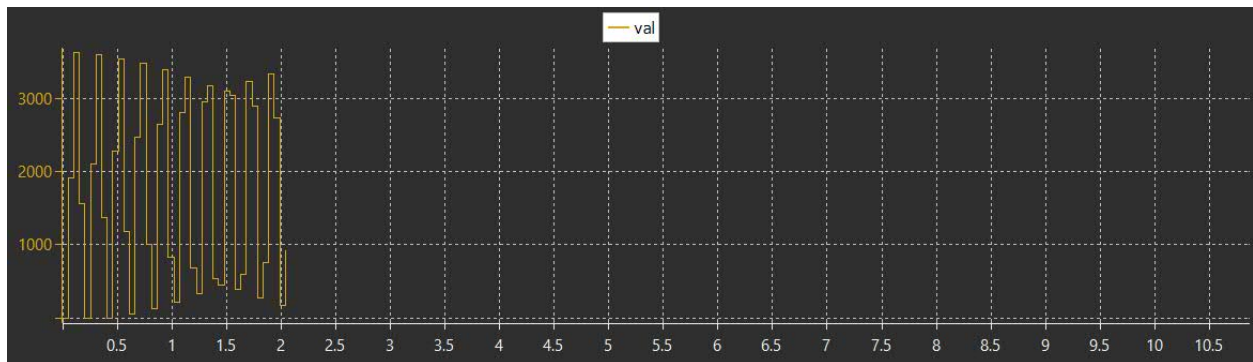
fid = fopen('val.bin'); % file should be in the working directory
data = fread(fid,inf,'float'); % put 'float' instead of int if your data is float type.
fclose(fid);

figure; |
stem(data,'filled','LineWidth',2);
set(gca,'FontSize',14)
grid on;
xlabel('n','FontSize',16);
ylabel('x[n]','FontSize',16);
title("Val for 1Hz Signal"); % This is the title of the plot (modify for each different plot)

```



5Hz

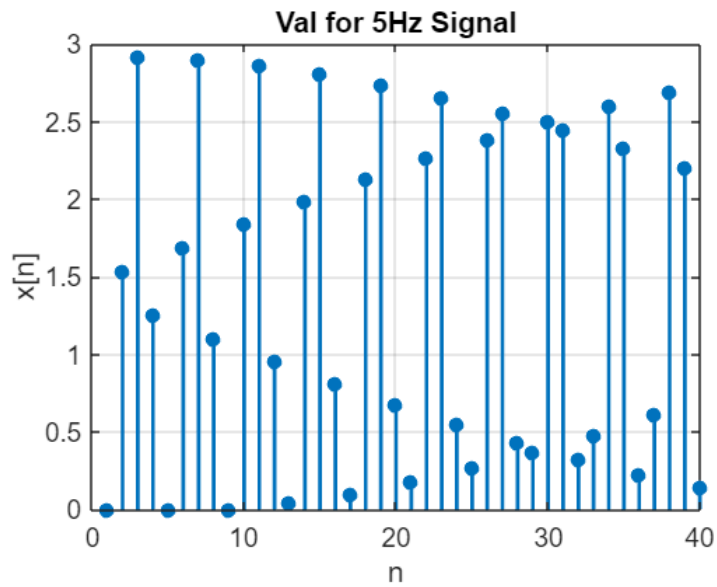


```

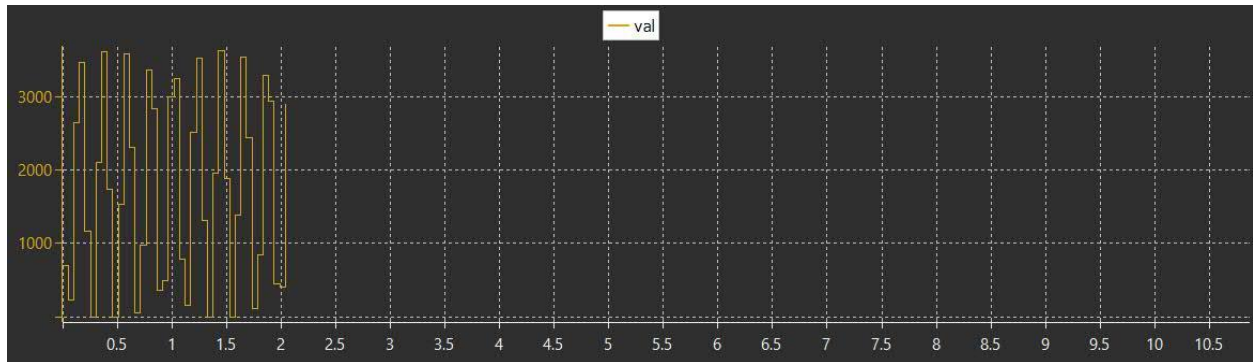
fid = fopen('val2.bin'); % file should be in the working directory
data = fread(fid,inf,'float'); % put 'float' instead of int if your data is float type.
fclose(fid);

figure;
stem(data,'filled','LineWidth',2);
set(gca,'FontSize',14)
grid on;
xlabel('n','FontSize',16);
ylabel('x[n]','FontSize',16);
title("Val for 5Hz Signal"); % This is the title of the plot (modify for each different plot)

```

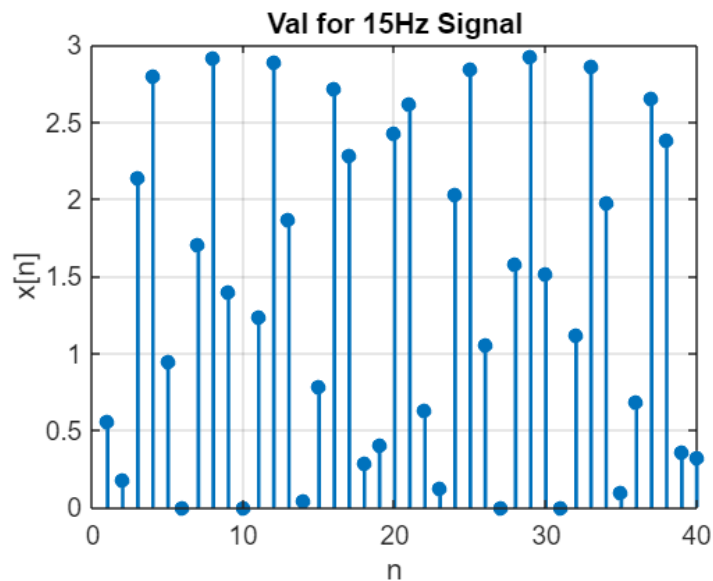


15Hz





```
fid = fopen('val3.bin'); % file should be in the working directory
data = fread(fid,inf,'float'); % put 'float' instead of int if your data is float type.
fclose(fid);

figure;
stem(data,'filled','LineWidth',2);
set(gca,'FontSize',14)
grid on;
xlabel('n','FontSize',16);
ylabel('x[n]','FontSize',16);
title("Val for 15Hz Signal"); % This is the title of the plot (modify for each different plot)
```



- Task-2:

Live Expression screenshot and sampling rate calculation.

Expression	Type	Value
 val2	uint32_t	206
real_val		Failed to evaluate
 timer_counter2	uint32_t	9

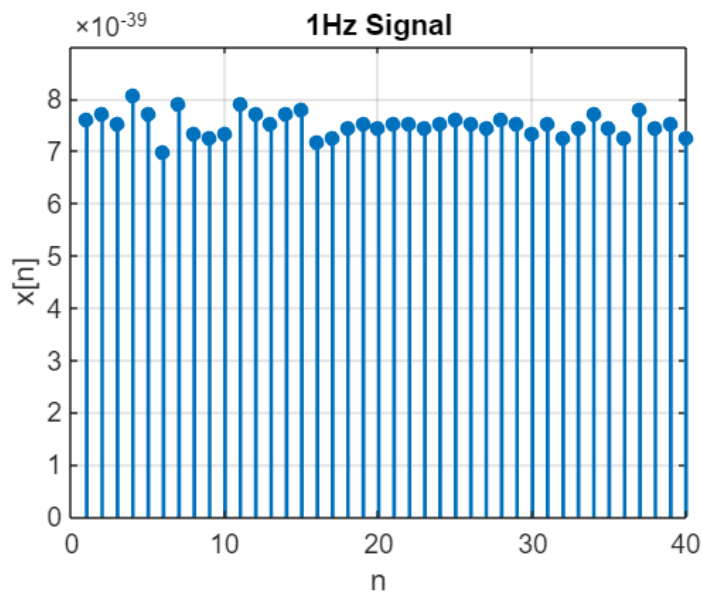
9 microseconds

- Task-3:

1Hz

```
fid = fopen('vals5.bin'); % file should be in the working directory
data = fread(fid,inf,'float'); % put 'float' instead of int if your data is float type.
fclose(fid);

figure;
stem(data,'filled','LineWidth',2);
set(gca,'FontSize',14)
grid on;
xlabel('n','FontSize',16);
ylabel('x[n]','FontSize',16);
title("1Hz Signal"); % This is the title of the plot (modify for each different plot)
```



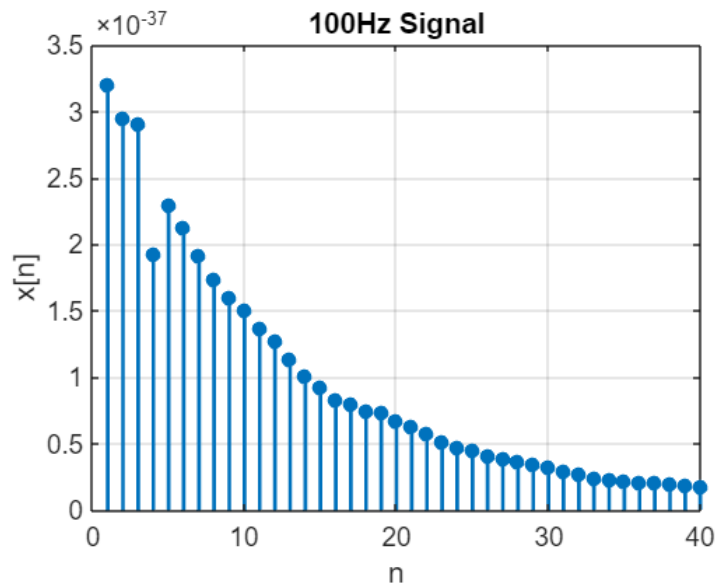
100Hz

```

fid = fopen('val4.bin'); % file should be in the working directory
data = fread(fid,inf,'float'); % put 'float' instead of int if your data is float type.
fclose(fid);

figure;
stem(data,'filled','LineWidth',2);
set(gca,'FontSize',14)
grid on;
xlabel('n','FontSize',16);
ylabel('x[n]','FontSize',16);
title("100Hz Signal"); % This is the title of the plot (modify for each different plot)

```



### Conclusion:

There were some strange errors that were raised when I started task 1. The values were defined as multiple definitions (though by commenting the section they were defined showed the error “no definition for the variable”). Professor Tekes and I resorted to change the variable names by adding a 2 to the original names and it ran smoothly after that point. The live expressions page was bugged as it didn’t show up in the debugging menu when I needed to check the variable expression change. I was able to find it from one of the hidden bars eventually.

The rest of the lab went smoothly after that point.