ECE434 filter warriors,

After a couple of EI sessions, here are some clues to help some of you with CPX2:

(1) If you designed in **filterDesigner**, how can you access the numerator and denominator of the transfer function to filter the signals?

- In the filterDesigner window,
  -- convert the Structure to Direct Form 1, by
  --- Edit → Convert Structure → Direct Form I
  --- export your filter to the matlab workspace
  File → Export →
  Export To → Workspace
  Export As → Coefficients
  (will add Num and Den to workspace)

(2) Once I design a filter, how do I use it in the workspace?

- One method is to use Matlab's "filter" command

```
>> help filter
>> y = filter(Num, Den, x)
```

If it is just a FIR with no Den

```
>> y = filter(Num, 1, x)  % or use the conv() command
```

(4) A picture is worth a thousand words. You definitely should be pasting some of your matlab figures into your word report. You can save the matlab figures as .jpg, then import them into word.

- Sometimes the frequency domain plot is useful; sometimes the time domain plot is useful; sometimes both are useful
- Example; for signal x3, besides figuring out its frequency, you are to lower the noise floor. You can see this result in the frequency domain plot. Is the time domain plot useful (before and after)? If you zoom into the time domain plot before it looks pretty noisy; hard to find the sinusoid. What does it look like after filtering when you zoom into the time domain plot???

(4) How do I save my filter design to a file?

- For example, if you have copied several pairs of num/den filter to variables like b3 and a3…
  - b3 = Num
  - a3 = Den
- To save your workspace variables
  - help save
  - save 'cpx2_lastname.bin' a1 b1 a2 b2 a3 b3
  - Note: Outlook seems to block .mat file extensions but not .bin

Happy hunting,
Dr York