

# FFT filtering on CO2 sensor

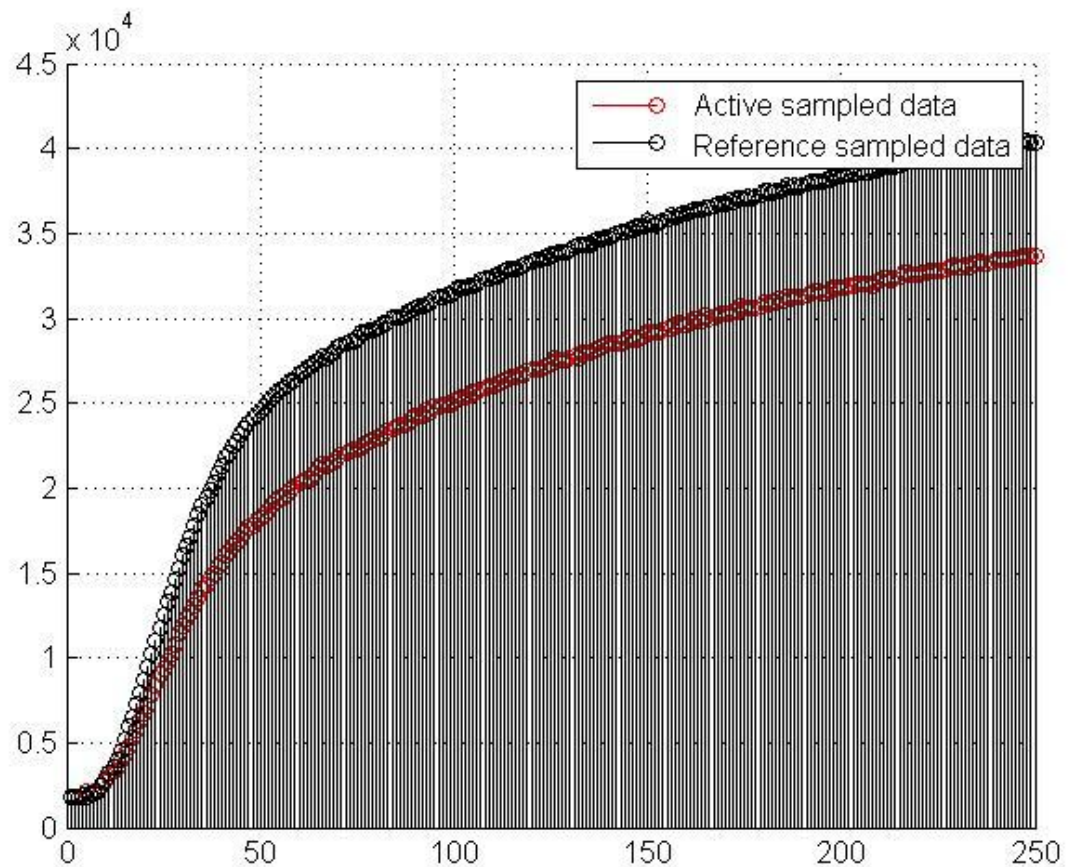
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## Given:

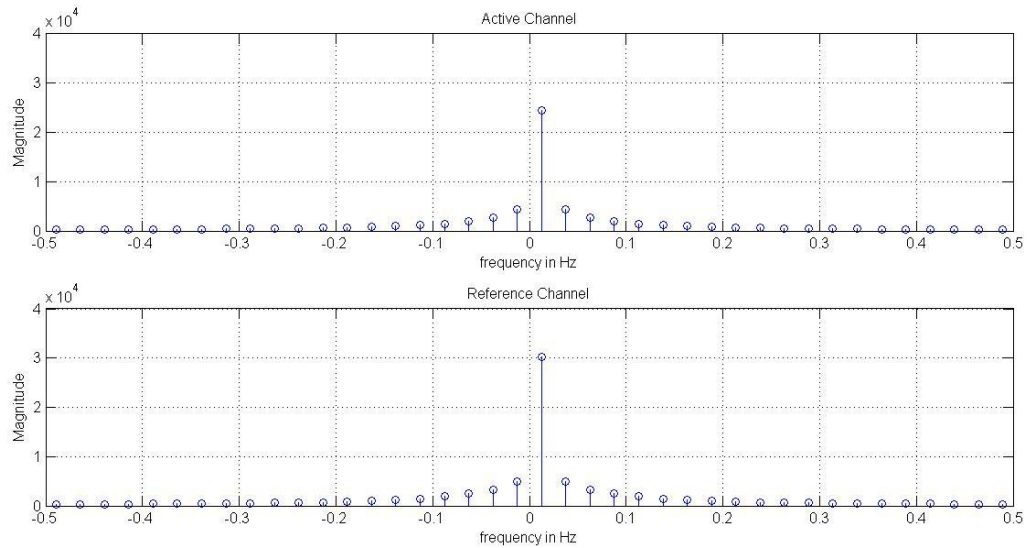
1. Sampled data, sampling period : 160ms

## Some notes:

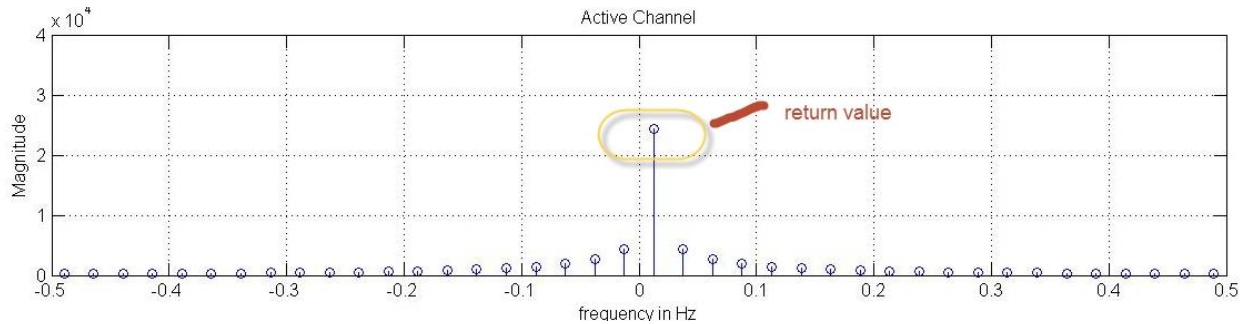
1. First checked with MATLAB.
2. Implemented in C to add in the existing project
3. Given sampled data for active and reference channel are plotted for a single period (250 sampled data) as:



4. With help of Discrete Fourier Transform, frequency spectrum was calculated. FFT is used to analyze the frequency spectrum and some portion of active and reference channel frequency spectrum are shown as :



5. Found the maximum amplitude 'return value' in active channel as shown below:



### Some notes on MATLAB Coding:

1. Use of matlab built in function  $\rightarrow$  fft
2. Returns 'return value' as a maximum value in form of output of FFT\_CO2 function

### Some notes on C coding:

1. C code has been developed using 'MATLAB CODER'
2. The function 'FFT\_CO2.c' takes 250\*1 double data as input and produces a single double value as output.
3. Input big data is always fixed length (250\*1, double) for example :

```
active_data= [1849
1757
1845
1960
2103
```

2075  
2135  
2165  
2412  
2666  
2985  
3299  
3589  
3948  
4328  
4778  
5313  
5761  
6285  
6719  
7186  
7812  
8392  
8997  
9381  
9846  
10268  
10835  
11421  
11848  
12313  
12597  
13073  
13493  
14114  
14335  
14694  
14975  
15398  
15654  
16030  
16258  
16627  
16845  
17036  
17396  
17715  
17846  
18090  
18272  
18398  
18722  
19017  
19161  
19390  
19464  
19675  
19881  
20132  
20349  
20454  
20527

20583  
20808  
21165  
21450  
21294  
21441  
21519  
21683  
21913  
22036  
22188  
22269  
22295  
22425  
22655  
22770  
22883  
22937  
22941  
23155  
23377  
23494  
23595  
23662  
23658  
23845  
23989  
24252  
24245  
24302  
24533  
24505  
24751  
24758  
24863  
24879  
24902  
25096  
25265  
25354  
25350  
25491  
25628  
25662  
25804  
25889  
26024  
25984  
26088  
26185  
26305  
26469  
26530  
26562  
26632  
26706  
26838

27000  
27033  
27003  
27071  
27188  
27263  
27633  
27511  
27518  
27560  
27667  
27747  
27689  
27952  
27941  
27930  
28041  
28206  
28305  
28368  
28490  
28481  
28539  
28566  
28668  
28867  
28807  
28784  
28870  
28995  
29221  
29187  
29180  
29177  
29260  
29358  
29400  
29563  
29732  
29602  
29664  
29740  
29939  
29919  
29879  
30127  
29982  
30086  
30181  
30310  
30308  
30256  
30376  
30414  
30699  
30626  
30629

30617  
30563  
30728  
30964  
30818  
30917  
30919  
31109  
31063  
31229  
31199  
31224  
31208  
31209  
31340  
31450  
31614  
31542  
31504  
31462  
31612  
31758  
31759  
31825  
31794  
31889  
31908  
31976  
32060  
32053  
32019  
31962  
32165  
32238  
32330  
32366  
32296  
32365  
32413  
32649  
32638  
32581  
32574  
32592  
32661  
32715  
32794  
32827  
32840  
32748  
32891  
33046  
33122  
32996  
32991  
33086  
33056

33234  
33273  
33304  
33262  
33233  
33326  
33429  
33442  
33464  
33423  
33397  
33520  
33577  
33720  
33635  
33671  
33666  
];