

Assignment-11

Design a simple FIR filter using HLS

Simulation :

```
1 #include <iostream>
2 #include <complex>
3 using namespace std;
4 #define N 4
5
6 typedef std::complex<double> >cmplx;
7
8 void fir_filter(cmplx x[N], cmplx h[N], cmplx y[N*N-1]);
9
10
11 int main ()
12 {
13     cmplx x[N]={1.1j,(2.1),(3.1),(4.1j)};
14     cmplx h[N]={1.1j,(2.1),(3.1),(4.1j)};
15     cmplx y[N*N-1];
16     fir_filter(x,h,y);
17     for(int i=0;i<N*N-1;i++)
18     {
19         std::cout << y[i] << " ";
20     }
21 }
22
23 return 0 ;
24 }
25
26
```

Vivado HLS Console

```
Starting C simulation ...
INFO: Applying HLS V2K22 patch v1.2 for IP revision
INFO: [HLS 200-10] Running /home/sekhar/xilinx_installation_directory/Vivado/2019.2/bin/unwrapped/linux64.o/vivado_hls
INFO: [HLS 200-10] For user 'sekhar' on host 'sekhar-optiplex-7060' (Linux x86_64 version 4.15.0-142-generic) on Tue Mar 28 11:34:26 IST 2023
INFO: [HLS 200-10] On os Ubuntu 16.04.7 LTS
INFO: [HLS 200-10] In directory '/home/sekhar/Desktop/c++/fir_filter_28/solution1'
INFO: [HLS 200-10] Opening project '/home/sekhar/Desktop/c++/fir_filter_28/solution1'
INFO: [HLS 200-10] Opening solution '/home/sekhar/Desktop/c++/fir_filter_28/solution1'
INFO: [SYN 201-201] Setting up clock 'default' with a period of 10ns.
WARNING: [HLS 200-40] Cannot find library '/home/sekhar/xilinx_installation_directory/Vivado/2019.2/common/technology/xilinx/zynqplusRFSOC/zynqplusRFSOC.lib'.
WARNING: [HLS 200-40] Cannot find library 'xilinx/zynqplusRFSOC/zynqplusRFSOC'.
INFO: [SIM 211-2] ***** CSIM start *****
INFO: [SIM 211-4] CSIM will launch GCC as the compiler.
Compiling ../../../../../../cmplx_filter/cmplx_filter.cpp in debug mode
Generating csim.exe
(0,2) (2,0) (7,12) (16,20) (22,14) (15,8) INFO: [SIM 211-1] CSim done with 0 errors.
INFO: [SIM 211-3] ***** CSIM finish *****
Finished C simulation.
```

Result ;

```
1 INFO: [SIM 2] ***** CSIM start *****
2 INFO: [SIM 4] CSIM will launch GCC as the compiler.
3 Compiling ../../../../../../cmplx_filter/cmplx_filter.cpp in debug mode
4 Compiling ../../../../../../cmplx_filter/cmplx_filter.cpp in debug mode
5 Generating csim.exe
6 (0,2) (2,0) (7,12) (16,20) (22,14) (15,8)
7 INFO: [SIM 1] CSim done with 0 errors.
8 INFO: [SIM 3] ***** CSIM finish *****
9
```

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Matlab Result

