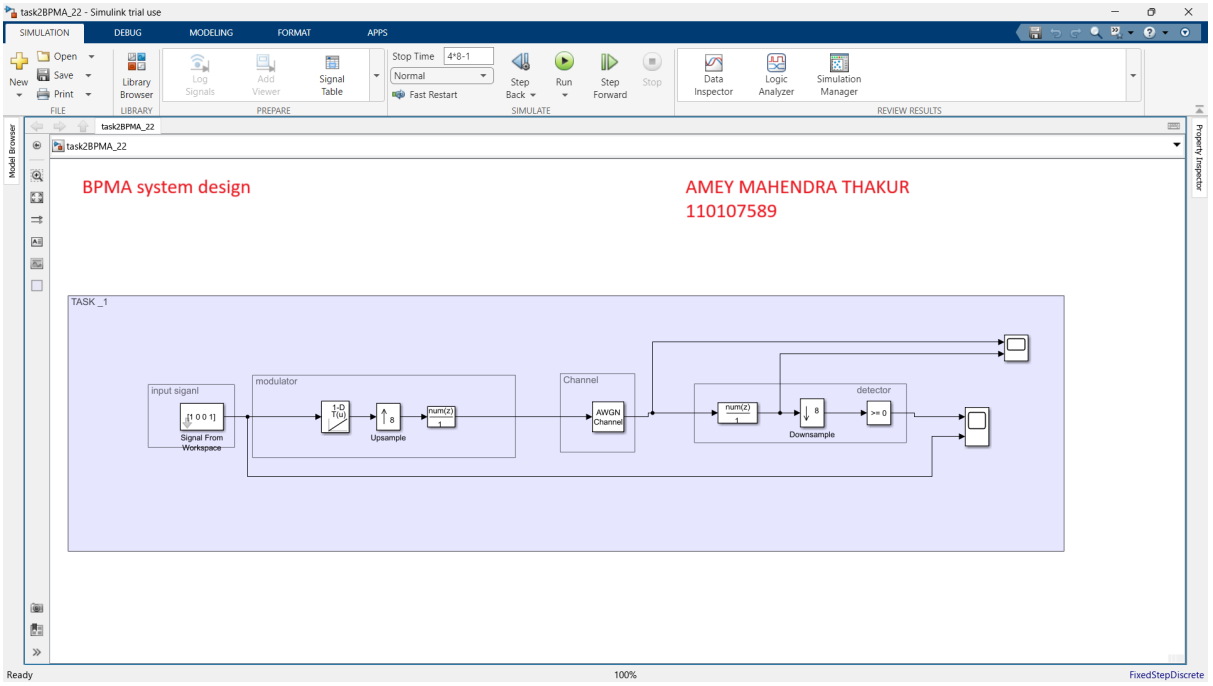
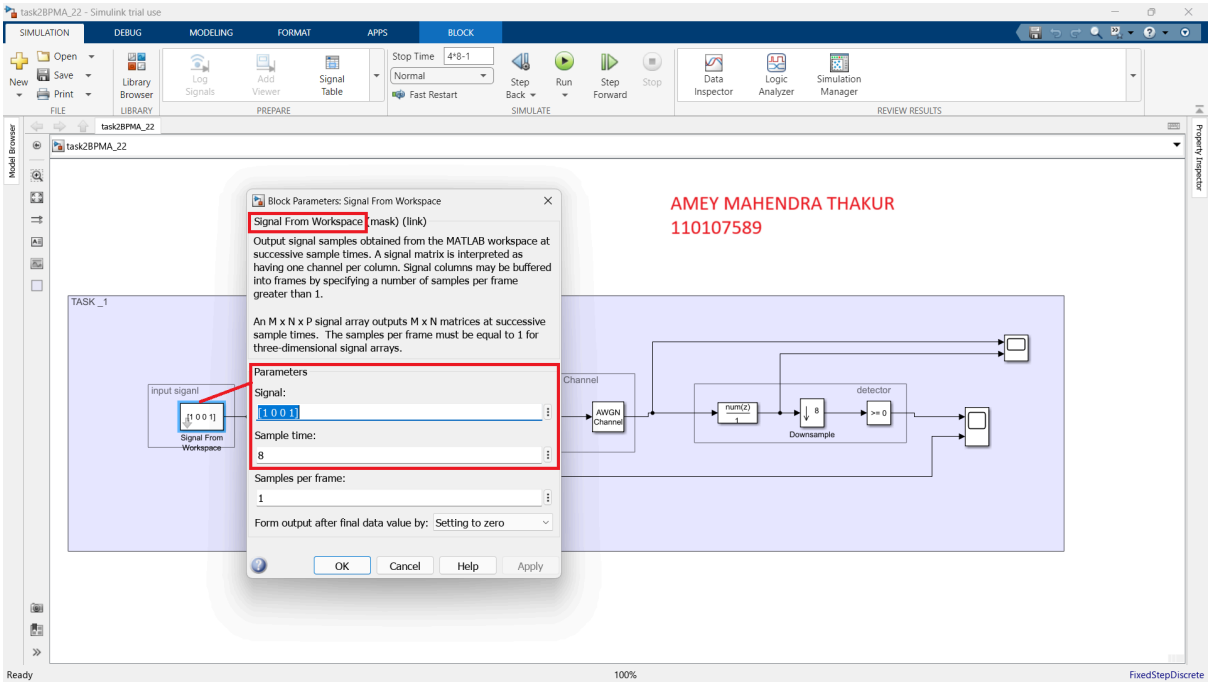
Task 2
BPAM System Design & Subtask - 1

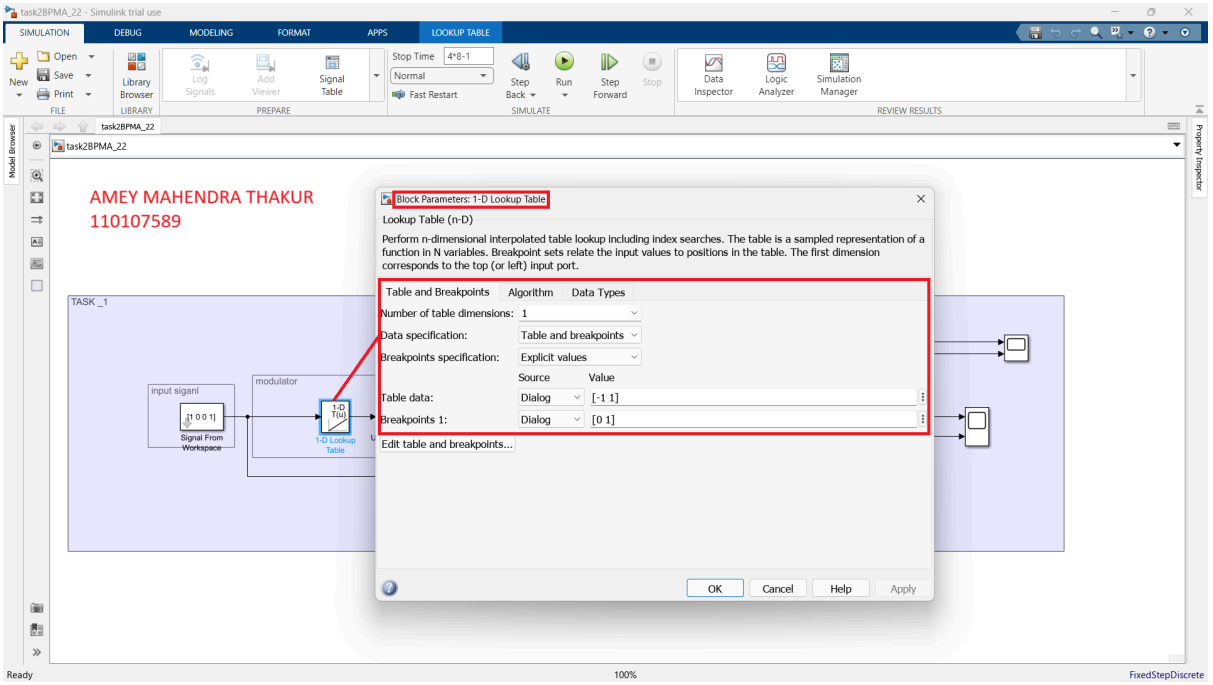
BPAM system design:

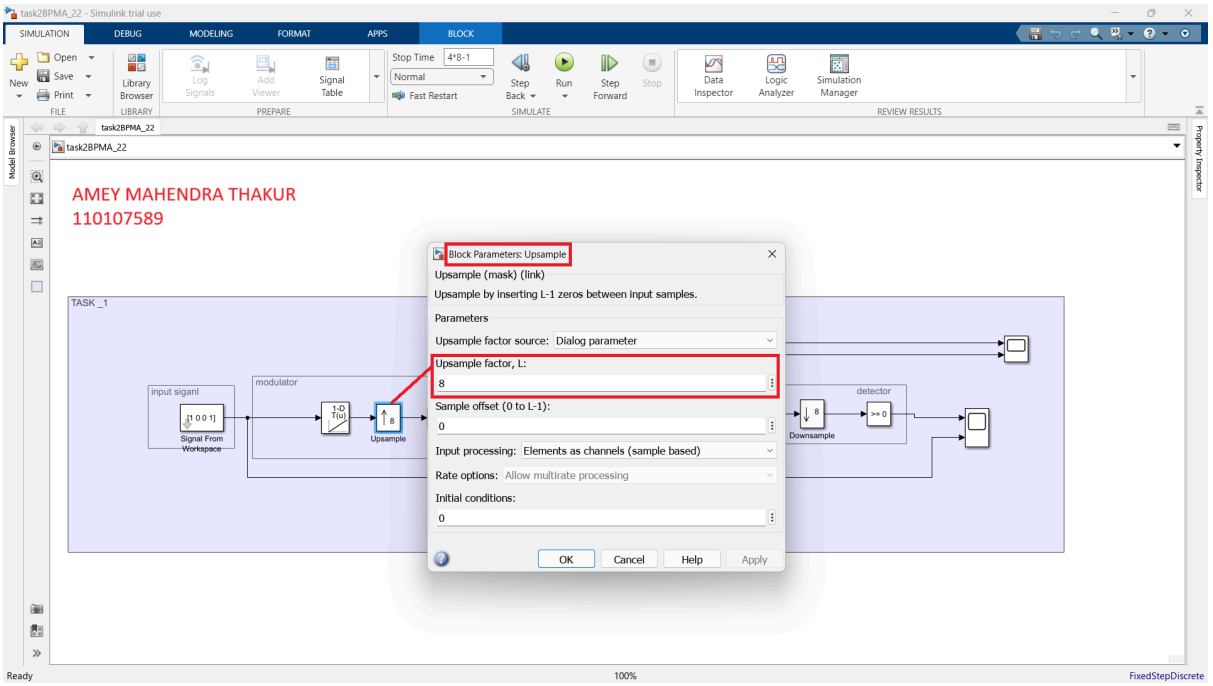
Modulator and detector design block :

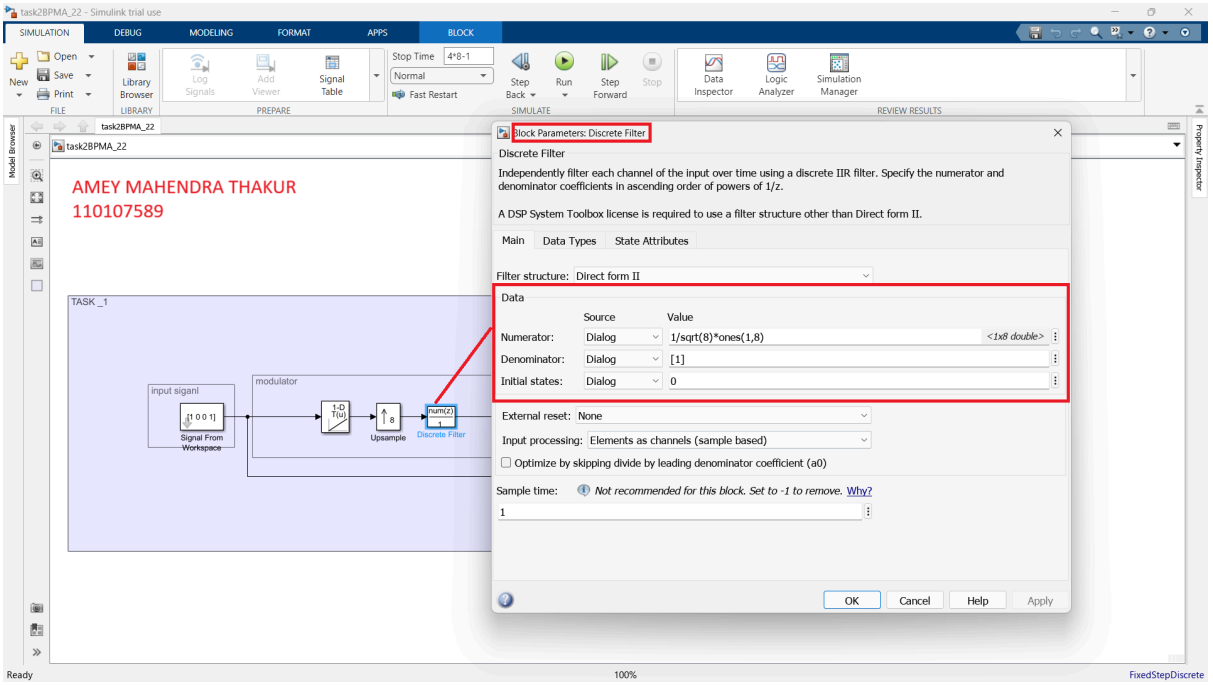


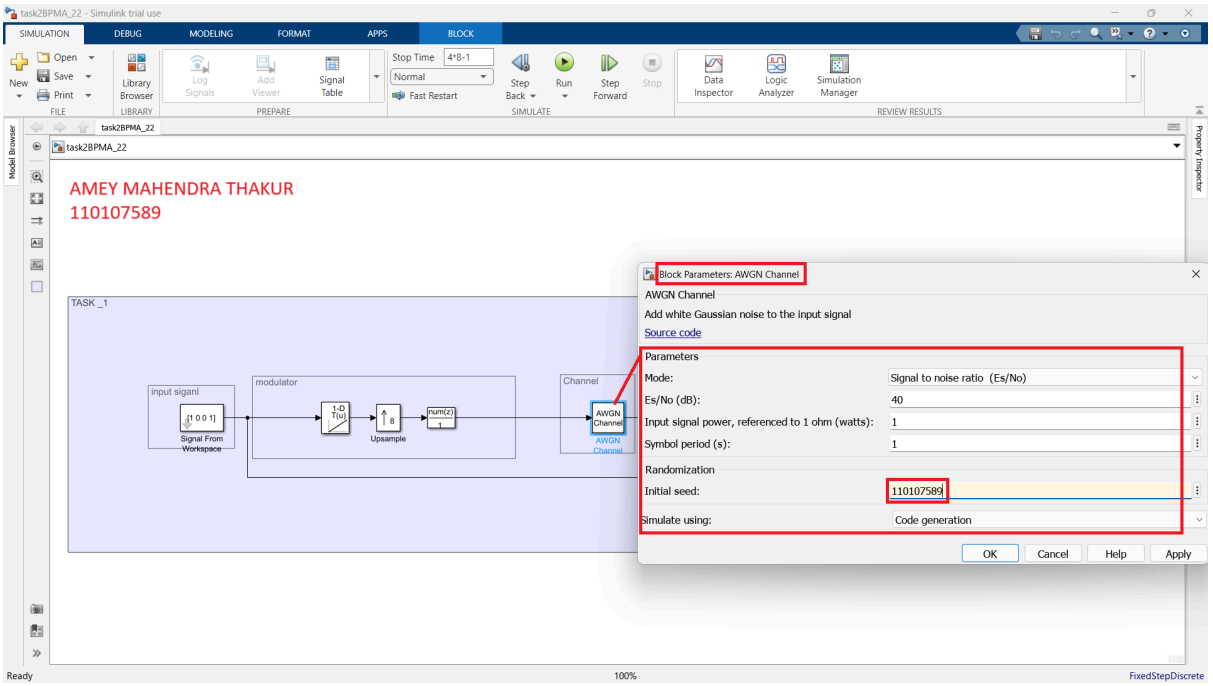
Modular Parameters:



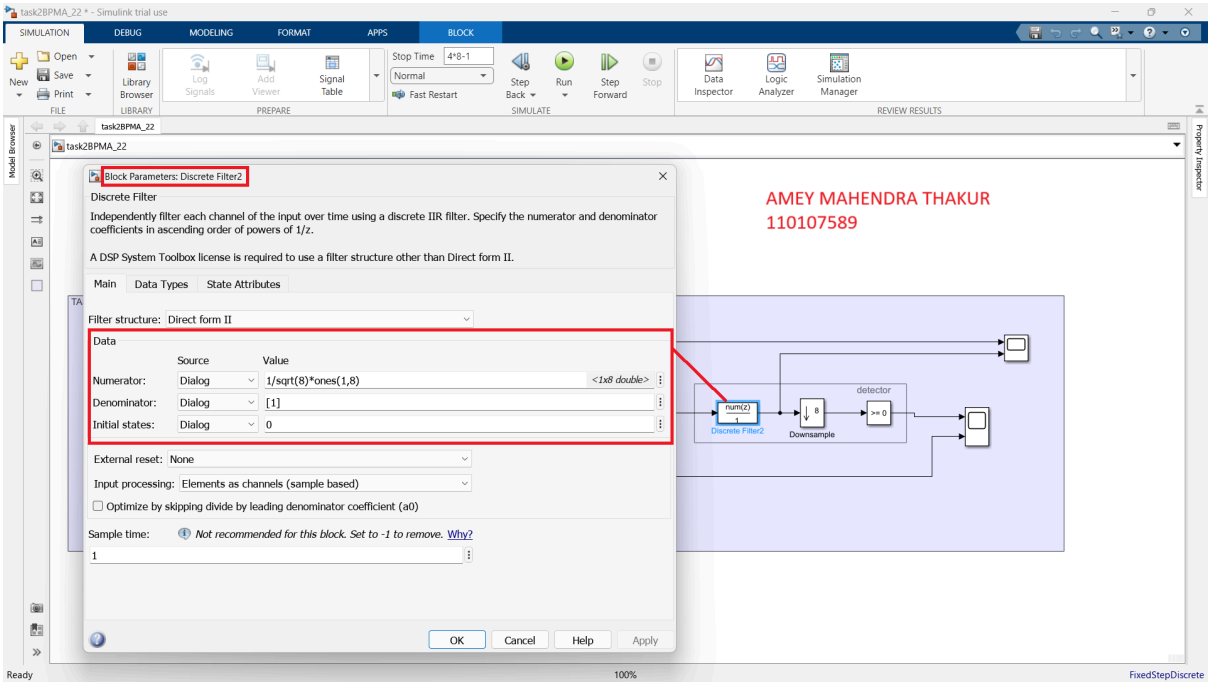

AMEY MAHENDRA THAKUR
110107589
Block Parameters: 1-D Lookup Table
Lookup Table (n-D)
Perform n-dimensional interpolated table lookup including index searches. The table is a sampled representation of a function in N variables. Breakpoint sets relate the input values to positions in the table. The first dimension corresponds to the top (or left) input port.
Table and Breakpoints
Algorithm
Data Types
Number of table dimensions: 1
Data specification: Table and breakpoints
Breakpoints specification: Explicit values
Source
Value
Table data: Dialog [-1 1]
Breakpoints 1: Dialog [0 1]
Edit table and breakpoints...
OK
Cancel
Help
Apply
TASK_1
input signal
modulator
Signal From Workspace
1-D Lookup Table
Ready
100%
FixedStepDiscrete

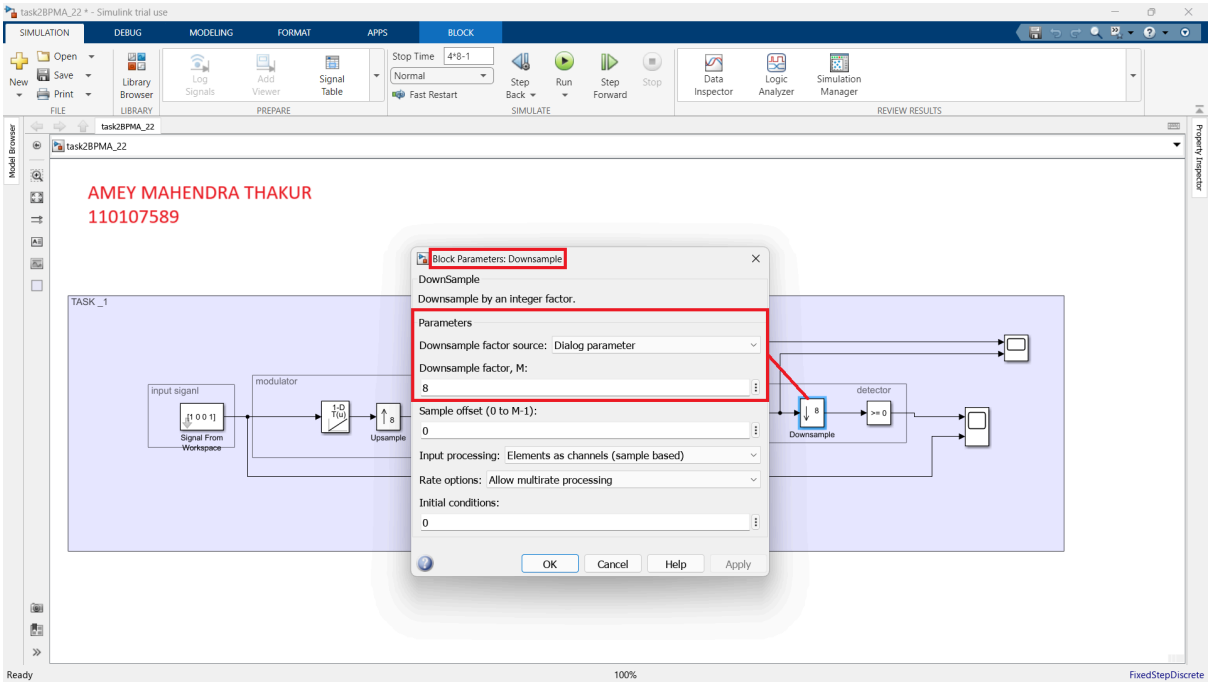

AMEY MAHENDRA THAKUR
110107589
Block Parameters: Upsample
Upsample (mask) (link)
Upsample by inserting L-1 zeros between input samples.
Parameters
Upsample factor source: Dialog parameter
Upsample factor, L:
8
Sample offset (0 to L-1):
0
Input processing: Elements as channels (sample based)
Rate options: Allow multirate processing
Initial conditions:
0
OK
Cancel
Help
Apply
TASK_1
input signal
modulator
Signal From Workspace
Upsample
Downsample
detector
Ready
100%
FixedStepDiscrete

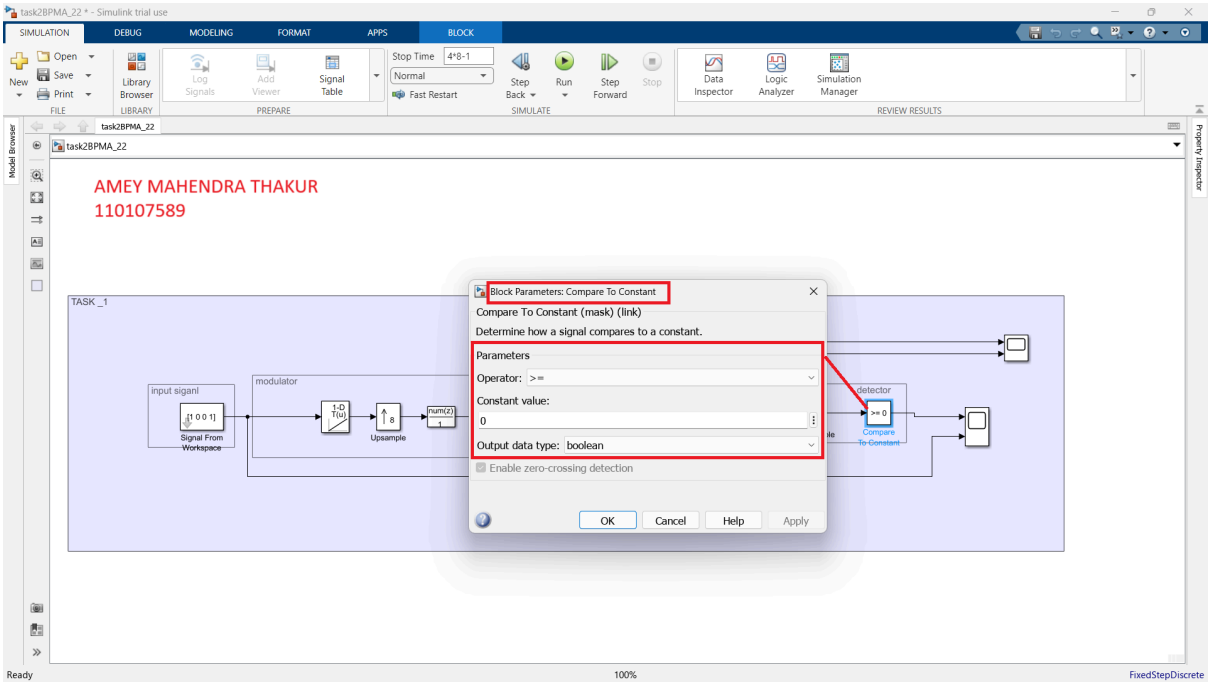

task2BPMA_22 - Simulink trial use
AMEY MAHENDRA THAKUR
110107589
TASK _1
input signal
modulator
Signal From Workspace
Upsample
Discrete Filter
Block Parameters: Discrete Filter
Discrete Filter
Independently filter each channel of the input over time using a discrete IIR filter. Specify the numerator and denominator coefficients in ascending order of powers of 1/z.
A DSP System Toolbox license is required to use a filter structure other than Direct form II.
Main
Data Types
State Attributes
Filter structure: Direct form II
Data
Source
Value
Numerator: Dialog 1/sqrt(8)*ones(1,8) <1x8 double>
Denominator: Dialog [1]
Initial states: Dialog 0
External reset: None
Input processing: Elements as channels (sample based)
Optimize by skipping divide by leading denominator coefficient (a0)
Sample time: Not recommended for this block. Set to -1 to remove. Why?
1
OK
Cancel
Help
Apply
Ready
100%
FixedStepDiscrete


task2BPMA_22 - Simulink trial use
AMEY MAHENDRA THAKUR
110107589
TASK _1
input signal
modulator
Channel
Signal From Workspace
Upsample
AWGN Channel
Block Parameters: AWGN Channel
AWGN Channel
Add white Gaussian noise to the input signal
Source code
Parameters
Mode: Signal to noise ratio (Es/No)
Es/No (dB): 40
Input signal power, referenced to 1 ohm (watts): 1
Symbol period (s): 1
Randomization
Initial seed: 110107589
Simulate using: Code generation
OK
Cancel
Help
Apply
Ready
100%
FixedStepDiscrete

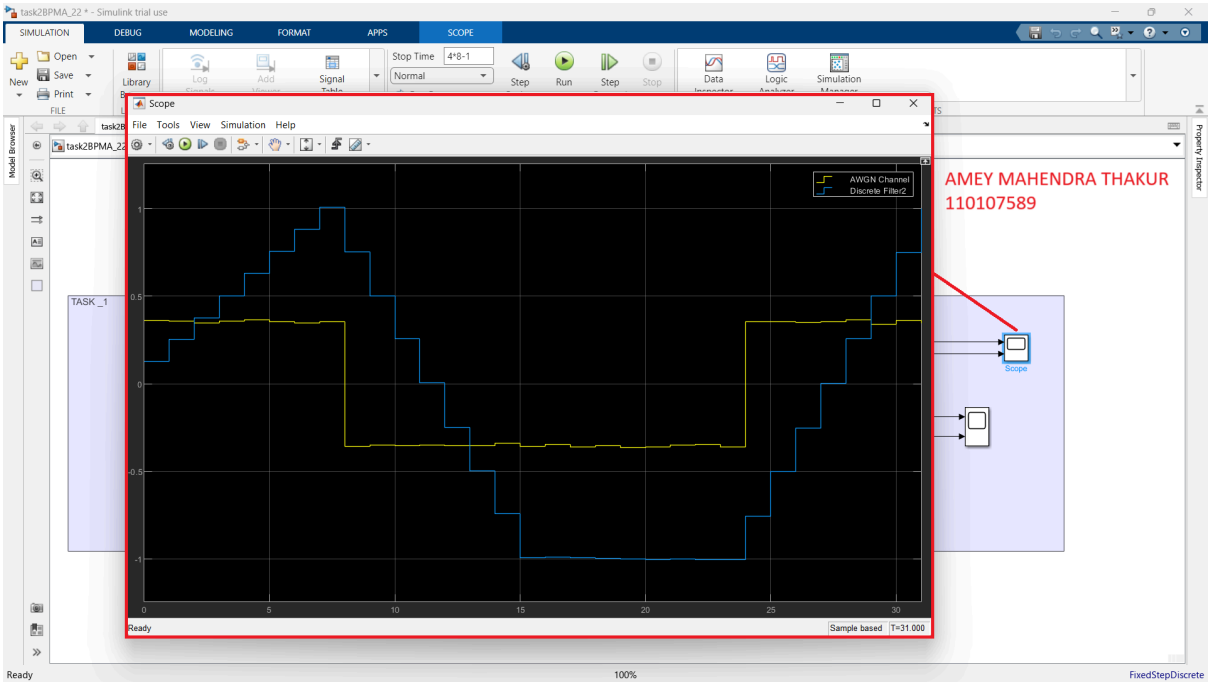
Detector parameters:







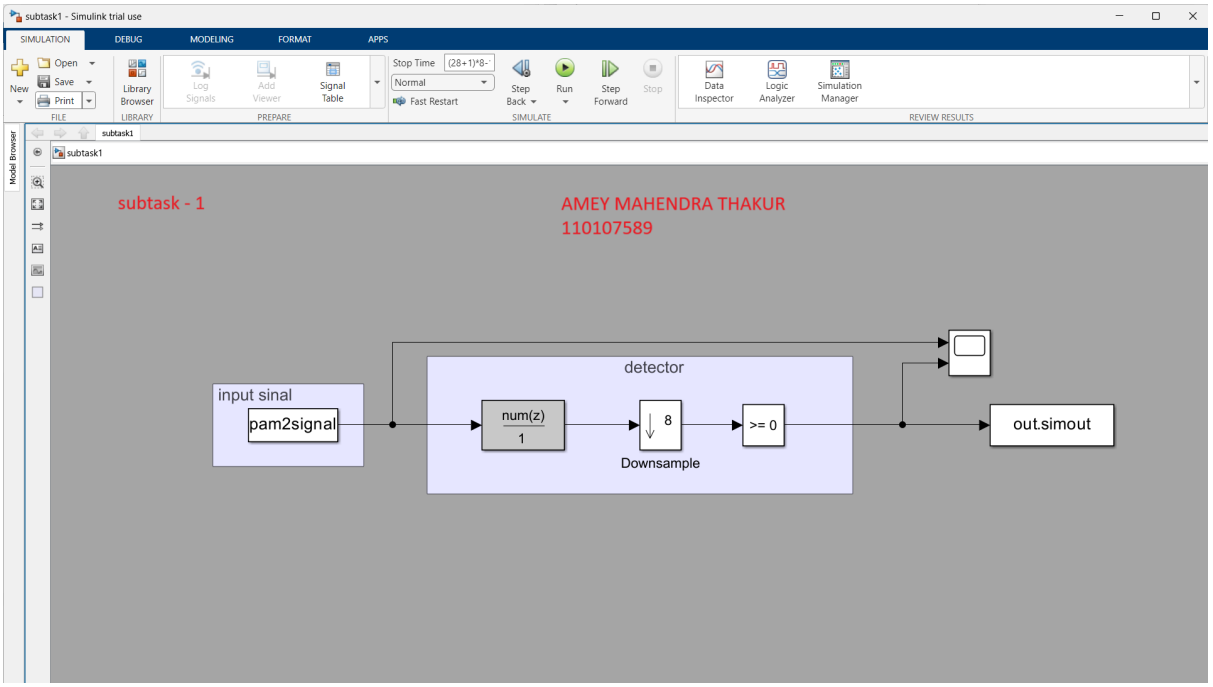
Output of the scope:



This result is extracted from the channel and discrete filter.

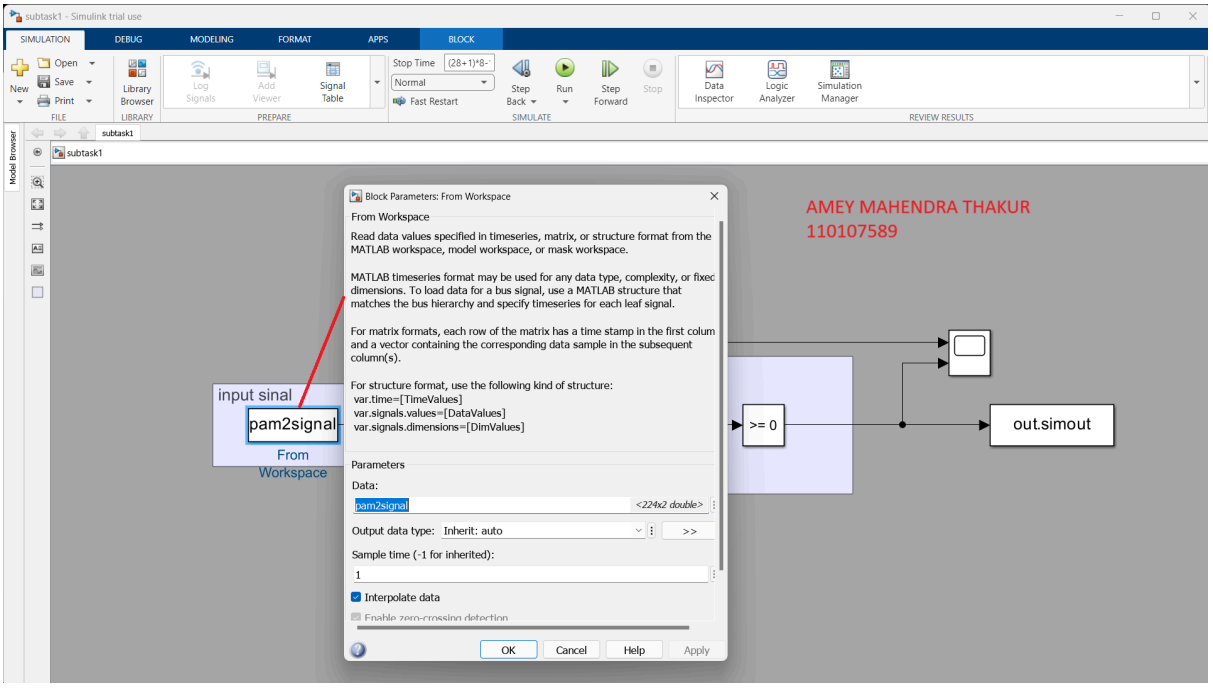
Subtask - 1

The screenshot displayed below illustrates the subtask-1 block, where the input "pam2signal" is sourced from the file provided for the task.

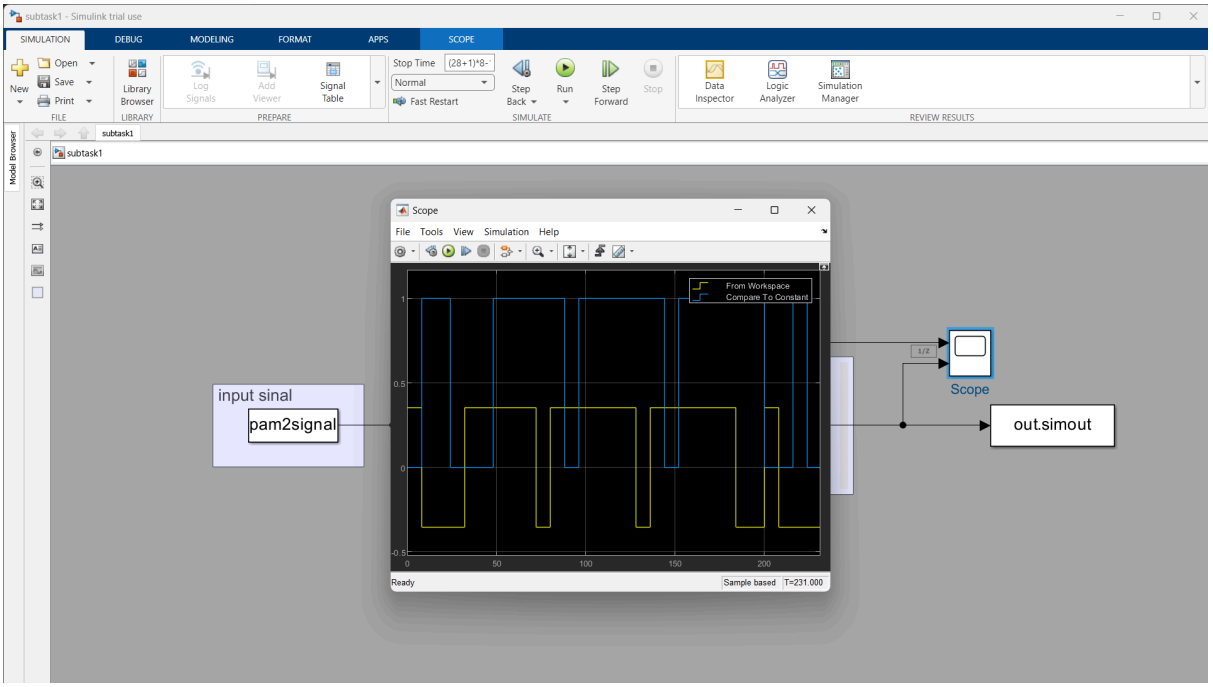


Input signal and detector design:

For subtask-1, the detector parameters are identical to those of the BPMA detector. Regarding the input signal, the block parameters are as indicated below.



Scope result :



ASCII message output:

Secret message = “Good”