Question: 4. Write a test bench program for 4-bit Full Adder / Subtractor u...

4. Write a test bench program for 4-bit Full Adder / Subtractor using the given truth table and verify its Verilog code for 4-bit Full Adder / Subtractor.

4-bit Full Adder / Subtractor						
Inputs			Outputs			
Carry-in	A	B	A+B	Carry out	A-B	Borrow out
0	0001	0101				
1	0001	0101				
0	1001	0001				
1	1001	0000				
0	0110	0010				
1	0110	0010				
0	0001	0111				
1	0001	0111				
0	1111	1111				
1	1111	1111				

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Expert Answer

Anonymous answered this
325 answers

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Test bench for 4-bit Adder/subtractor module

```
`timescale 1ns/1ps

module addersubtract_4bit_tb;
//Inputs
 reg [3:0] A;
 reg [3:0] B;
 reg cin;
//Outputs
 wire [3:0] sum, [3:0] borrow;
 wire Carryout, borrow_out;
// Temporary looping variable
 reg [3:0] i = 4'd0;
// Instatiate the Unit under Test (UUT)
 add_subtract_4bit uut (A1, A2, A3, A4, B1, B2,
  .A1(A[0]), .A2(A[1]), .A3(A[2]), .A4(A[3]),
  .B1(B[0]), .B2(B[1]), .B3(B[2]), .B4(B[3]), .cin(cin),
  .S1(sum[0]), .S2(sum[1]), .S3(sum[2]), .S4(sum[3]),
  .cout(carry_out), .Bo1(borrow[0]), .Bo2(borrow[1]),
  .Bo3(borrow[2]), .Bo4(borrow[3]), .Bout(borrow_out)
 );
// A1, A2, A3, A4, B1, B2, B3, B4 = A,B inputs
// cin, cin
// S1, S2, S3, S4 = sum[0:3], Bo1, Bo2, Bo3, Bo4 = borrow[0:3],
   cout, Carry_out, Bout = borrow_out.
initial begin
 A = 4'b0;
 B = 4'b0;
 cin = 1'b0;
```

```
// wait 100ns for global reset
#100;
// stimulus
for (i=0; i<16; i=i+1'b1) begin
    {A,B,cin} = {A,B,cin} + 1'b1;
    #20;
end
// Above stimulus covers all input combinations.
end
endmodule
```

If you want individual stimulus after #100 in above code
& remove temporary looping declaration.

```
A = 4'b0001;
B = 4'b0101;
cin = 0;
#20
cin = 1;
#20
& so on.
```

Repeat above fragment for all other input stimus. Write $finish after all stimulus to end simulation.

Mistake: change limit from 16 to 31 in for loop.

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A: See answer 100% (1 rating)

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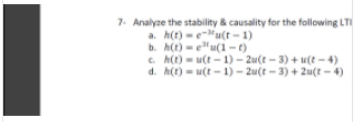
7- Analyze the stability & causality for the following LTI systems: a. h(t) = e-3tu(t – 1) b. htt) = eôtu(1 - t) C. h(t) = u(t – 1) – 2u(t – 3) + u(t – 4) d. h(t) = ...



See answer

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A: See answer 100% (1 rating)

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A: See answer 100% (2 ratings)

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