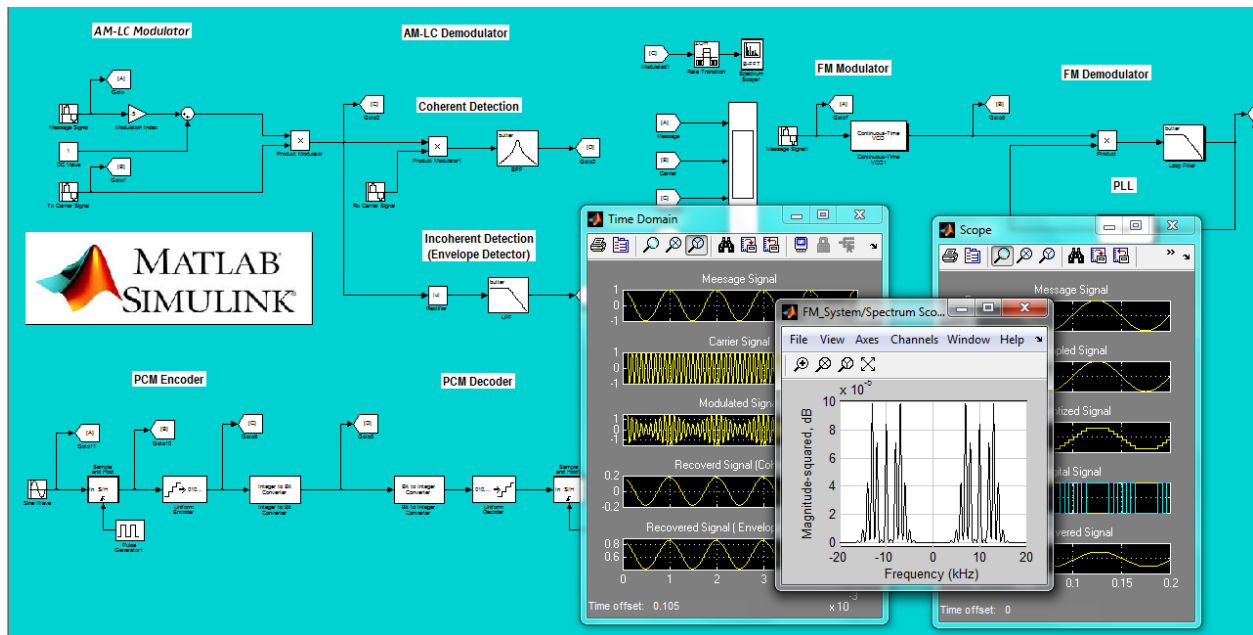


Modeling Communication Systems Using Simulink

SSB Modulation System Model (Filtering Method)



Eng. Anas Alashqar

Modeling Communication Systems Using Simulink: SSB Modulation System Model (Filtering Method)

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Chapter 1. Model Version

Version: 1.11

Last modified: Mon Dec 16 18:45:50 2013

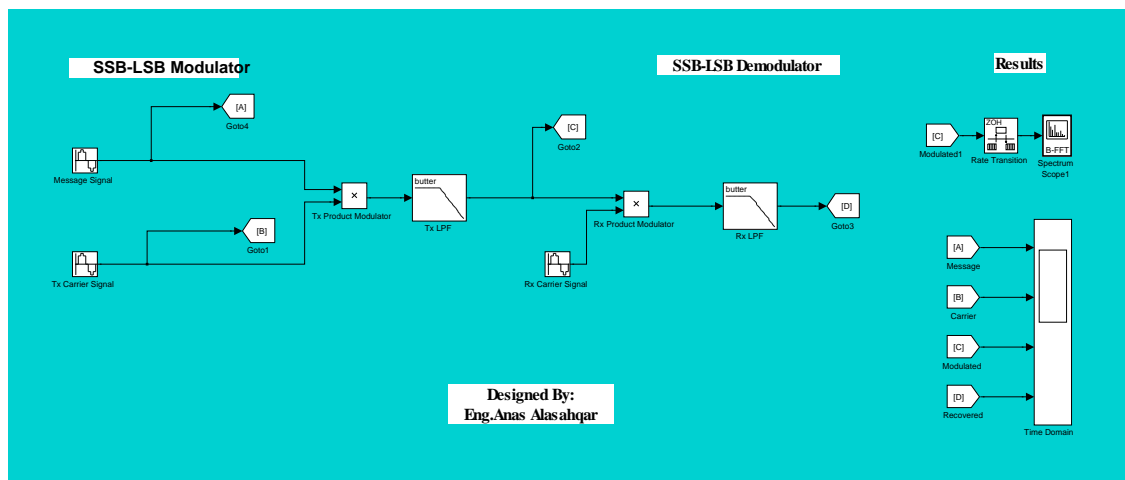
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Chapter 2. SSB Modulation System Model

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Figure 2.1. SSB_Filtering_Method_System



2.1. Blocks

2.1.1. Parameters

2.1.1.1. "Carrier" (From)

Table 2.1. "Carrier" Parameters

Parameter	Value
Goto tag	B
Icon display	Tag

2.1.1.2. "Goto1" (Goto)

Table 2.2. "Goto1" Parameters

Parameter	Value
Tag	B

Parameter	Value
Icon display	Tag
Tag visibility	local

2.1.1.3. "Goto2" (Goto)

Table 2.3. "Goto2" Parameters

Parameter	Value
Tag	C
Icon display	Tag
Tag visibility	local

2.1.1.4. "Goto3" (Goto)

Table 2.4. "Goto3" Parameters

Parameter	Value
Tag	D
Icon display	Tag
Tag visibility	local

2.1.1.5. "Goto4" (Goto)

Table 2.5. "Goto4" Parameters

Parameter	Value
Tag	A
Icon display	Tag
Tag visibility	local

2.1.1.6. "Message" (From)

Table 2.6. "Message" Parameters

Parameter	Value
Goto tag	A
Icon display	Tag

2.1.1.7. "Message Signal" (Sin)

Table 2.7. "Message Signal" Parameters

Parameter	Value
Sine type	Time based
Time (t)	Use simulation time
Amplitude	1
Bias	0
Frequency (rad/sec)	$2 \cdot \pi \cdot 1000$
Phase (rad)	$\pi/2$
Samples per period	1=
Number of offset samples	0
Sample time	1e-6
Interpret vector parameters as 1-D	on

2.1.1.8. "Modulated" (From)

Table 2.8. "Modulated" Parameters

Parameter	Value
Goto tag	C
Icon display	Tag

2.1.1.9. "Modulated1" (From)

Table 2.9. "Modulated1" Parameters

Parameter	Value
Goto tag	C
Icon display	Tag

2.1.1.10. "Rate Transition" (RateTransition)

Table 2.10. "Rate Transition" Parameters

Parameter	Value
Ensure data integrity during data transfer	on

Parameter	Value
Ensure deterministic data transfer (maximum delay)	on
Initial conditions	0
Output port sample time options	Specify
Sample time multiple(>0)	1
Output port sample time	1/30000

2.1.1.11. "Recovered" (From)

Table 2.11. "Recovered" Parameters

Parameter	Value
Goto tag	D
Icon display	Tag

2.1.1.12. "Rx Carrier Signal" (Sin)

Table 2.12. "Rx Carrier Signal" Parameters

Parameter	Value
Sine type	Time based
Time (t)	Use simulation time
Amplitude	1
Bias	0
Frequency (rad/sec)	$2 \cdot \pi \cdot 10000$
Phase (rad)	$\pi/2$
Samples per period	1=
Number of offset samples	0
Sample time	1e-6
Interpret vector parameters as 1-D	on

2.1.1.13. "Rx LPF" (StateSpace)

Table 2.13. "Rx LPF" Parameters

Parameter	Value
Design method	Butterworth

Parameter	Value
Filter type	Lowpass
Filter order	7
Passband edge frequency (rad/s)	$2\pi \cdot 1000$

2.1.1.14. "Rx Product Modulator" (Product)

Table 2.14. "Rx Product Modulator" Parameters

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

2.1.1.15. "Tx Carrier Signal" (Sin)

Table 2.15. "Tx Carrier Signal" Parameters

Parameter	Value
Sine type	Time based
Time (t)	Use simulation time
Amplitude	1
Bias	0
Frequency (rad/sec)	$2\pi \cdot 10000$
Phase (rad)	$\pi/2$

Parameter	Value
Samples per period	1e6
Number of offset samples	0
Sample time	1e-6
Interpret vector parameters as 1-D	on

2.1.1.16. "Tx LPF" (StateSpace)

Table 2.16. "Tx LPF" Parameters

Parameter	Value
Design method	Butterworth
Filter type	Lowpass
Filter order	15
Passband edge frequency (rad/s)	$2\pi \cdot 9000$

2.1.1.17. "Tx Product Modulator" (Product)

Table 2.17. "Tx Product Modulator" Parameters

Parameter	Value
Number of inputs	2
Multiplication	Element-wise(.*)
Multiply over	All dimensions
Dimension	1
Require all inputs to have the same data type	off
Output minimum	[]
Output maximum	[]
Output data type	Inherit: Inherit via internal rule
Lock output data type setting against changes by the fixed-point tools	off
Integer rounding mode	Zero
Saturate on integer overflow	off
Sample time (-1 for inherited)	-1

2.1.2. Block Execution Order

1. Tx LPF [7] (StateSpace)
2. Rate Transition [4] (RateTransition)
3. *Spectrum Scope1*
4. Message Signal [3] (Sin)
5. Tx Carrier Signal [6] (Sin)
6. Rx LPF [5] (StateSpace)
7. Time Domain [6] (Scope)
8. Rx Carrier Signal [5] (Sin)
9. Rx Product Modulator [6] (Product)
10. Tx Product Modulator [7] (Product)
11. Scope1 (SignalViewerScope)