实验项目四 2FSK/2PSK 调制解调仿真

实验项目目的:

- 1. 掌握 2FSK 的调制解调原理和 Matlab/Simulink 仿真方法;
- 2. 掌握 2PSK 的调制解调原理和 Matlab/Simulink 仿真方法。

实验项目要求:

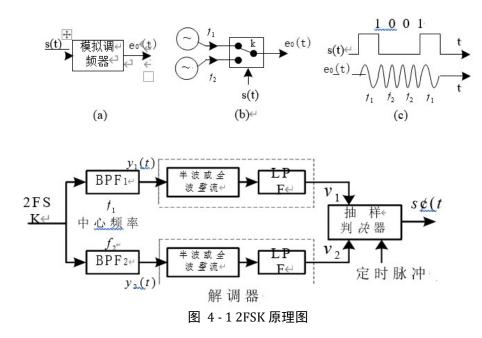
学生在学习通信原理相关理论的基础上,在规定时间内,完成实验线路的连接及 结果分析。

实验项目学时:

4 学时。

[实验项目准备]

1.2FSK 调制和解调原理详细见教材,调制框图和解调框图见下图:



2.2PSK 调制和解调原理详细见教材,调制框图和解调框图见下图:

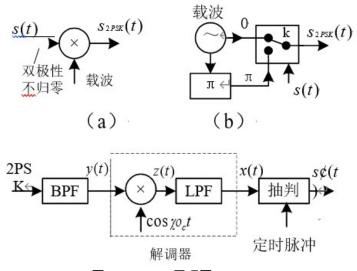


图 4-22PSK 原理图

[实验项目实施]

1.2FSK 调制解调仿真

2FSK 键控法调制、包络检波解调框图如下

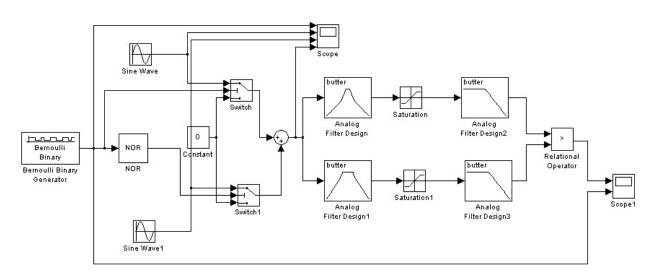


图 4-32FSK 连接图

Constant:设置为 0

具体参数设置如下:

Block Parameters: Bernoulli Binary Generator Bernoulli Binary Generator (mask) (link))
Generate a Bernoulli random binary number. To generate a vector output, specify the probability evector.	ıs a
Parameters	
Probability of a zero:	
0.5	
Initial seed:	
61	
Sample time:	
1	
Frame-based outputs	
Samples per frame:	
1	_
☐ Interpret vector parameters as 1-D	
OK Cancel <u>H</u> elp Apply	1

图 4-4 信号发生器参数

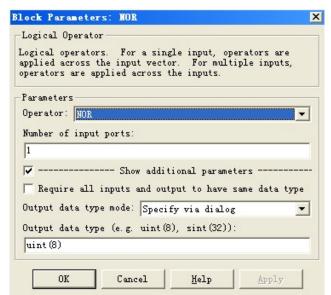


图 4-5 NOR 参数设置

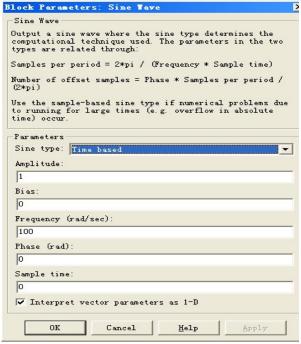


图 4-6 载波 1 参数设置

Block Parameters: Sine Tavel	×
-Sine Wave	
Output a sine wave where the sine type determines the computational technique used. The parameters in the two types are related through:	
Samples per period = 2*pi / (Frequency * Sample time)	
Number of offset samples = Phase * Samples per period / (2*pi)	
Use the sample-based sine type if numerical problems due to running for large times (e.g. overflow in absolute time) occur.	
Parameters	
Sine type: Time based	
Amplitude:	
1	
Bias:	
0	
Frequency (rad/sec):	
20	
Phase (rad):	
О	
Sample time:	
0	
✓ Interpret vector parameters as 1-D	
•	
OK Cancel <u>H</u> elp Apply	

图 4-7 载波 2 参数设置



图 4-8 switch 参数设置



图 4-9 模拟滤波器设置

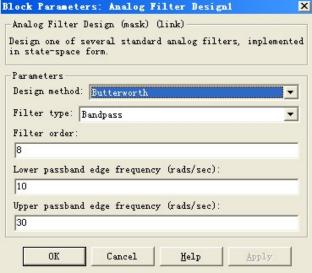


图 4-10 模拟滤波器设置

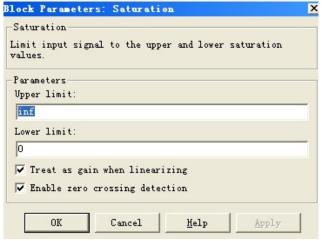


图 4-11 整流器参数设置

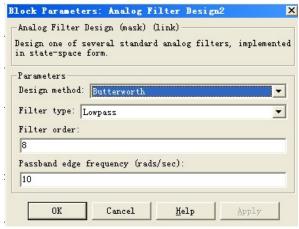


图 4-12 低通滤波器设置

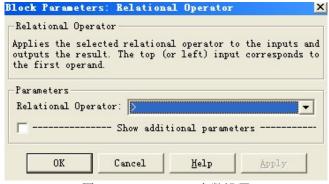


图 4-13 Relational 参数设置

2. 2PSK 调制解调仿真

2FSK 键控法调制、包络检波解调框图如下

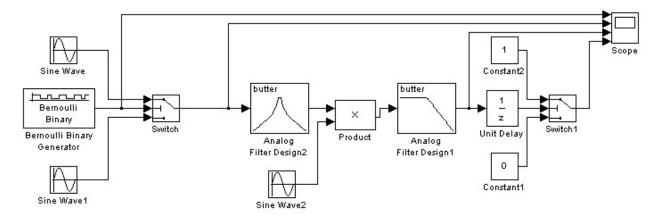


图 4-14 2PSK 连接图

参数设置如下:

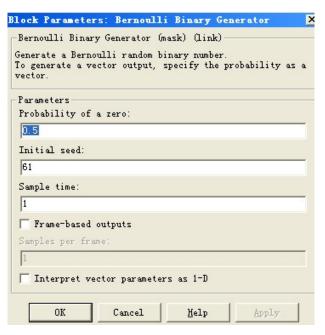


图 4-15 信号源设置

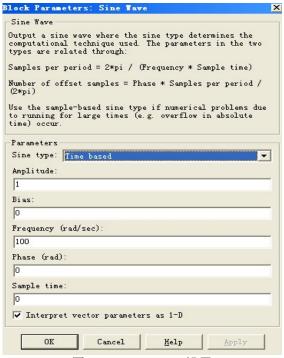


图 4-16 sine wave 设置

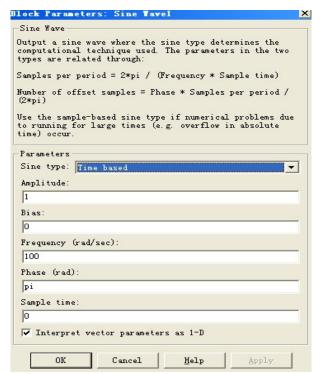


图 4-17 sine wave1 参数设置

Block Parameters: Analog Filter Design2	X
Analog Filter Design (mask) (link) Design one of several standard analog filters, imp in state-space form.	lemented
Parameters Design method: Butterworth	•
Filter type: Bandpass Filter order:	•
Lower passband edge frequency (rads/sec):	
Upper passband edge frequency (rads/sec):	
OK Cancel <u>H</u> elp App	ly

图 4-18 Analog Filter Design2 设置

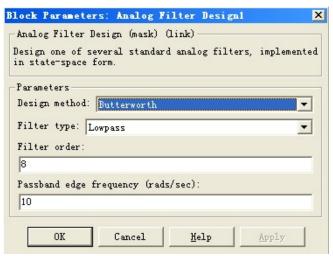


图 4-19 Analog Filter Design1 设置



图 4-20 switch1 设置

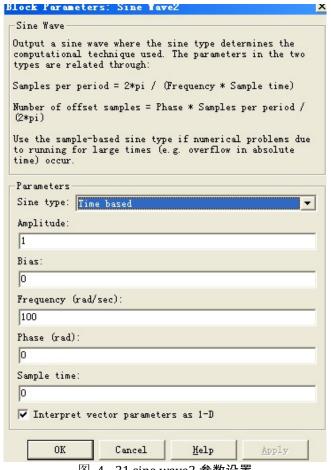


图 4-21 sine wave2 参数设置

[实验项目结果]

- 1. 仿真 2FSK 调制结果
- 2. 观察 2FSK 调制仿真,对比调制前后信号的幅度和频率发生了哪些变化? 当信 号源传送 1 的时候, 2FSK 信号是什么样子的, 当传送 0 的时候, 2FSK 信号又是什么 样子的。
 - 3. 画出 2PSK 仿真结果