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Modulation Technology Simulation Based on Labview

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Abstract

The main contents of this design is the model-based simulation Labview communication system to complete the basic model of communication system and communication system to build an integrated system covering binary digital modulation and demodulation, channel coding and other parts. Analysis of the performance of the communication system using a communication index Labview simulation function. Access to relevant information by the general model of learning communication system in mastering basic Labview programming methods, based on the design flow of integrated communication system, designed to draw a flow chart, so as to realize a modular system simulation. Because of this design, the design of the model simulation 6 communication system cannot list them here, with regard to the modulation and demodulation simulation 2ASK as a priority to introduce. 2ASK the carrier wave amplitude is a change in delivery of digital information, while the initial phase and frequency remain unchanged. The following is a simulation.

Keywords: Communication system model; Labview simulation; 2ASK modulation; 2ASK demodulation.

1. 2ASK modulation

Labview 2ASK modulation process simulation, in which use of a, b, c, d, e, f, g, h, i, m, n, and other modules. We will analyze the role of each module individually.

(1)、Module A is a string control, input binary baseband signal in the front panel of a module (note the input of the binary baseband signal just strings, not really binary sequence). (2)、Module b is a string length measuring function for measuring the length of the input string of binary baseband signal. (3)、C is a scanning module string function, and offset by the string input to the output value of the corresponding bit of the string, so that the value of the binary baseband signals are output on everyone. (4)、Module e is a basic function generator, which generates a carrier with a sine function. (5)、Module d is a condition of the structure, is "0" or "1" to carry out different operations by determining the binary baseband information in each bit value. If the value is "0", the constant "0" is multiplied with the carrier, the output is "0", if the value is "1", the constant "a" is multiplied with the carrier, which carrier signal is output, so that 2ASK completed modulated signal. (6)、Module j is a Gaussian white noise waveform function, by generating an input to control the size of the standard deviation of Gaussian white noise. (7)、Module k is a function of the sum, in Figure 1.1, 2ASK signal and Gaussian white noise signal generated by the sum, thus interfering with other signals in analog reality 2ASK modulation process. (8)、F is a module to obtain waveform component functions in Figure 1.1, in order to acquire a waveform component carrier, Y parameters and values of a series of carriers stored in the array. This is in order to produce a carrier signal with ho binary sequence. (9)、Module g is a measure of the size of the array functions in Figure 1.1, is used to measure the size of the acquired waveform component module f array. (10)、H is an array of module initialization function, in Figure 1, each sequence of numeric input module g by passing an array of sizes and modules c string passed to generate a new array. (11)、Module I is to create a wave function, in Figure 1, by array will "t0" and "dt" f transfer module and transfer module h to generate a true binary baseband signal. (12)、Module m is a time delay function in Figure 1.1, in order to delay the signal generated in the front panel, easy to observe the signal generation process. (13)、Module n is a For loop structure in Figure 1.1, for a cycle of the output module in each of the input string value, wherein the module b gets the length of the string passed to the for loop N, while the for loop i transfer to the module c, used as a scanning string offset input.

By the action of each module, the input string, the final output binary baseband signal, and outputs a modulated waveform 2ASK and 2ASK plus Gaussian white noise waveform.

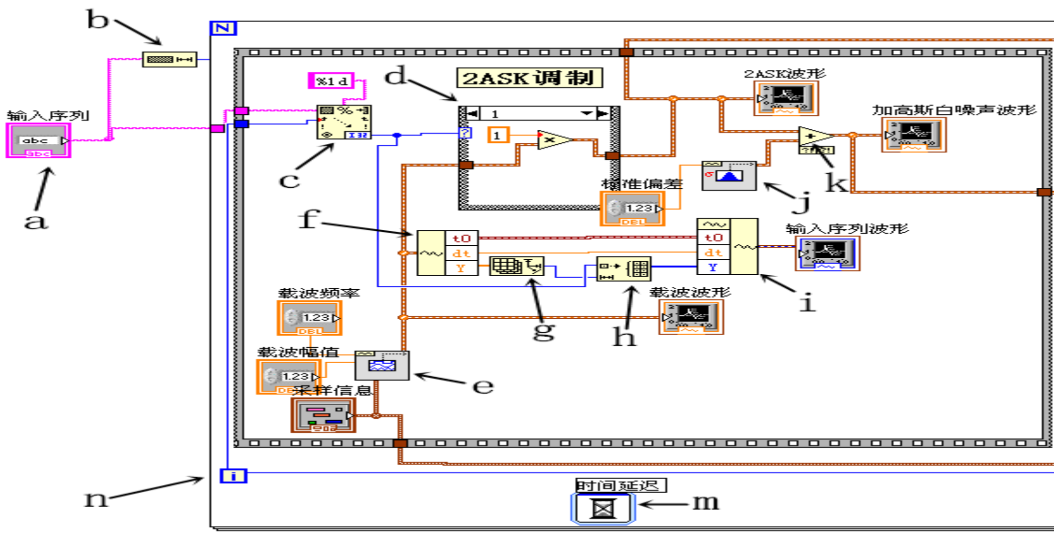

Figure 1. 2ASK modulation

2. Half-wave rectifier

2ASK demodulation half-wave rectification process is shown in Figure 2, where the use of a, b, c, d, e, f, g, h, i and m modules. We will analyze the role of each module individually. Module a is a band-pass filter cutoff frequency by setting the high and low cut-off frequency of the input signal with 2ASK white Gaussian noise filtering. Function module b is a comparison, by comparing the two data, generates "0" or "1." Module c is a scalar field value waveform comparison function, in Figure 2, the value of the input waveform data and the scalar value comparison, the boundary is set to "0", the comparison condition is "the highest or lowest value of the waveform is greater than or equal to the boundary ", which will compare the condition of the output waveform data, but did not pass the comparison condition is False, and not by limiting the value of comparative data, replace NaN. Module d is an indexed array function in Figure 2, the array module output by the output of the array index corresponding values. Module e is a get waveform component functions in Figure 2, to obtain the value d output module and passes it to the module m in the Y value. Module g is a one-dimensional array of search functions in Figure 2, search the array element index value NaN. H is equal to a function module, in Figure 2, with the address of the array out of bounds to a block g (search an array function) search is complete, but an array index of -1 indicates that the address array access out of bounds, so when the array index is -1 when to stop searching. Module i is a subset of the replacement array functions in Figure 2, the search for the module g is a NaN to delete array elements, so as to achieve the array element delete all NaN role. Module m is a While loop structure in Figure 2, because the module g (an array of search functions) are searched first NaN element, namely the search stops, so in order to complete the search in the array with all the elements a NaN While loop to control. Module f is a waveform creation function in Figure 2.1, by array modules e transmission "t0" and "dt" and transfer module m to generate a half-wave rectified waveform 2ASK signal.

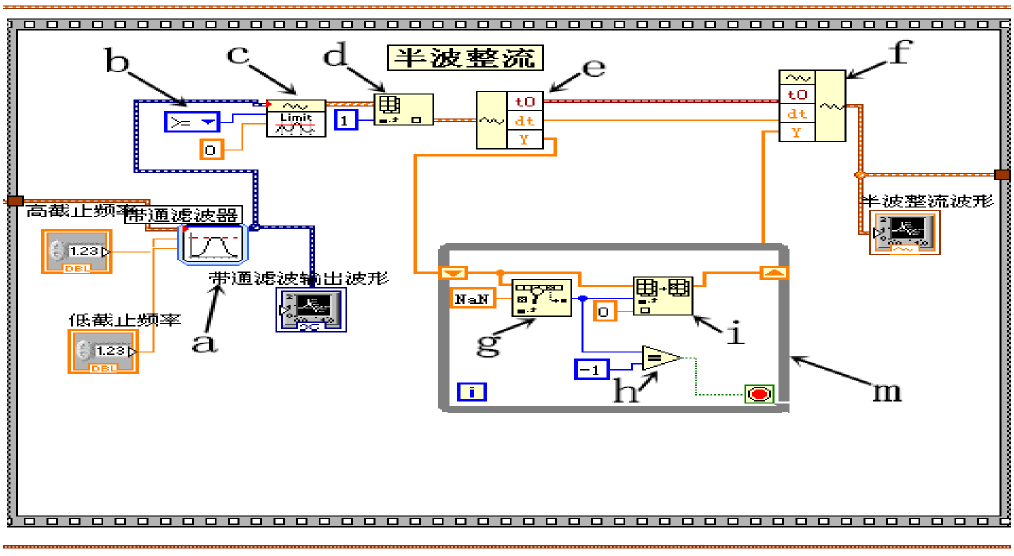

Figure 2. half-wave rectifier

3. Low pass filter

2ASK demodulation half-wave rectified low-pass filtering process is shown in Figure 3., which utilizes a and b modules. We will analyze the role of each module individually.

A module is a low-pass filter; it is the role by setting the cutoff frequency of the input signal through 2ASK half-wave rectification filtering. Module b is a conversion function from dynamic data in Figure 3, it will be converted into an array of data through Dynamic Data low-pass filtered signal.

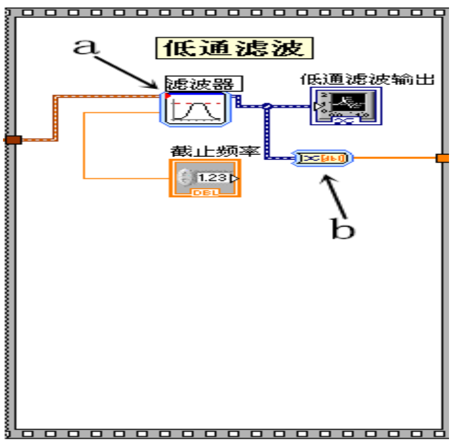

Figure 3. Low-pass filter

4. Points judgment

2ASK demodulation integrator decision process shown in Figure 4, where the use of a, b and c modules. We will analyze the role of each module individually.

A module is a function of the array elements are added, in Figure 4, the low-pass filter array module passed all of the data added.Module b is a local variable carrier amplitude. C is greater than a function module, in Figure 4, the value in the module through a series of operations, and then compared with the size 90, if more than 90, the output "1", otherwise, outputs "0."

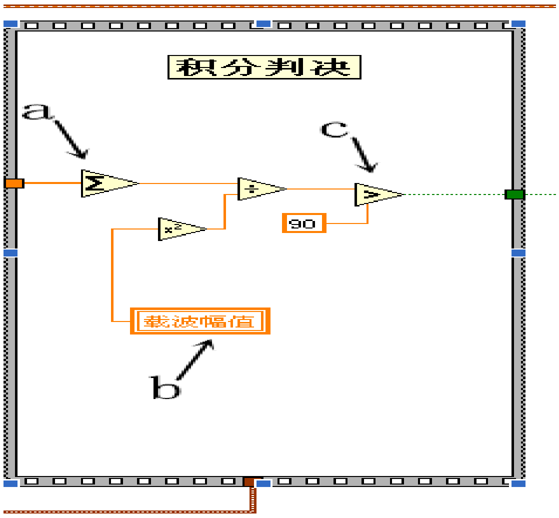

Figure 4. points verdict

5. Demodulated output waveform

2ASK output waveform demodulation process shown in Figure 5, which utilizes, b, c, d, e, f, g, and h and other modules. We will analyze the role of each module individually. Module A is a conditional structure in Figure 5, which by integrating decision block transfer data as conditional input, if the input is "0", the function output is "0", otherwise, the output is "1." B is a module to obtain waveform component functions in Figure 5, gets 2ASK modulation module 2ASK signal and passes it to the module value Y, c. Module c is a measure of the size of the array functions in Figure 5, is used to measure the size of the module waveform component b acquired array. Module d is a function to initialize the array, the array size and block a transfer of data generated by the module c pass a new array. E module is to create a wave function, in Figure 5, by passing the module b "t0" and "dt" as well as an array of module d passed to generate a binary baseband signal. Demodulation module g is a sequence of local variables. F is an array module insert function in Figure 5, by passing an array of module g module and a transfer of data, etc. to generate a new array, that is, the demodulated binary sequence array. H module is an array of display control to display the last 2ASK prepare a binary baseband signal.

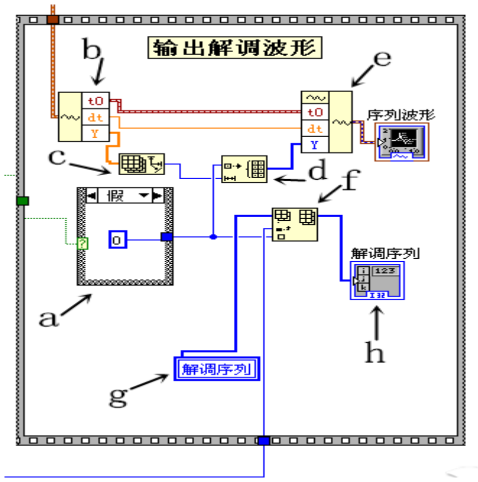

Figure 5. Demodulated output waveform

2ASK signal modulation and demodulation complete program shown in Figure 6.

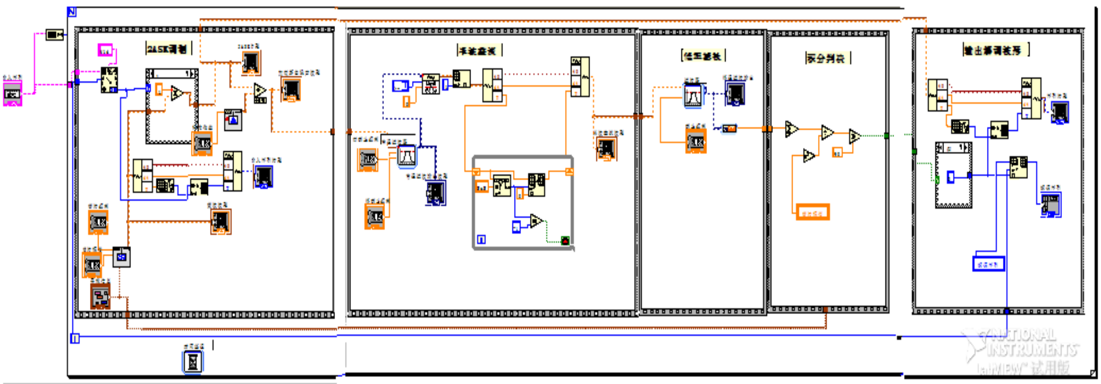

Figure 6. 2ASK modulation and demodulation complete program chart

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