Laboratory #9 Report

Class:

Name: Student ID:

1. Exploration 1

Table 9.1

|  |  |
| --- | --- |
| *Digital input (Binary)* | *Analog output VO (V)* |
| 0001 |  |
| 0010 |  |
| 0011 |  |
| 0100 |  |
| 0101 |  |
| 1011 |  |
| 1100 |  |
| 1101 |  |
| 1110 |  |
| 1111 |  |

1. Exploration 2

Table 9.2

|  |  |  |
| --- | --- | --- |
| *Analog input VIN (V)* | *Digital output (Binary)* | *Analog output VO (V)* |
|  | 0000 → 0001 |  |
|  | 0001 → 0010 |  |
|  | 0010 → 0011 |  |
|  | 0011 → 0100 |  |
|  | 0100 → 0101 |  |
|  | 1010 → 1011 |  |
|  | 1011 → 1100 |  |
|  | 1100 → 1101 |  |
|  | 1101 → 1110 |  |
|  | 1110 → 1111 |  |

Table 9.3

|  |  |
| --- | --- |
| *Digital output (Binary)* | *Quantization error VQ (V)* |
| 0000 → 0001 |  |
| 0001 → 0010 |  |
| 0010 → 0011 |  |
| 0011 → 0100 |  |
| 0100 → 0101 |  |
| 1010 → 1011 |  |
| 1011 → 1100 |  |
| 1100 → 1101 |  |
| 1101 → 1110 |  |
| 1110 → 1111 |  |

1. Exploration 3 **(Optional)**

Table 9.4

|  |  |
| --- | --- |
| *Digital input (Binary)* | *Analog output VO (V)* |
| 0000 0000 |  |
| 0000 0001 |  |
| 0000 0010 |  |
| 0000 0011 |  |
| 0000 0100 |  |
| 1111 1011 |  |
| 1111 1100 |  |
| 1111 1101 |  |
| 1111 1110 |  |
| 1111 1111 |  |

1. Exploration 4 **(Optional)**

Table 9.5

|  |  |  |
| --- | --- | --- |
| *Analog input VIN (V)* | *Digital output (Binary)* | *Analog output VO (V)* |
|  | 0000 0000→0000 0001 |  |
|  | 0000 0001→0000 0010 |  |
|  | 0000 0010→0000 0011 |  |
|  | 0000 0011→0000 0100 |  |
|  | 0000 0100→0000 0101 |  |
|  | 1111 1010→1111 1011 |  |
|  | 1111 1011→1111 1100 |  |
|  | 1111 1100→1111 1101 |  |
|  | 1111 1101→1111 1110 |  |
|  | 1111 1110→1111 1111 |  |

Table 9.6

|  |  |
| --- | --- |
| *Digital output (Binary)* | *Quantization error VQ (V)* |
| 0000 0000 → 0000 0001 |  |
| 0000 0001 → 0000 0010 |  |
| 0000 0010 → 0000 0011 |  |
| 0000 0011 → 0000 0100 |  |
| 0000 0100 → 0000 0101 |  |
| 1111 1010 → 1111 1011 |  |
| 1111 1011 → 1111 1100 |  |
| 1111 1100 → 1111 1101 |  |
| 1111 1101 → 1111 1110 |  |
| 1111 1110 → 1111 1111 |  |

1. Problem 1
2. Please plot the input-output transfer curve according the Table 9.1 by MATLAB or EXCEL. Use decimal code to present input signal. Normalize the output voltage to reference voltage.
3. Please plot the input-output transfer curve according the Table 9.2 by MATLAB or EXCEL. Use decimal code to present output signal. Normalize the analog input voltage (Vin) to reference voltage.
4. Problem 2

Please analyze the measured data in Table 9.3, and explain what ideal values they should be.

1. Conclusion