**深 圳 大 学 实 验 报 告**

**课程名称： 现代通信原理**

**实验项目名称： 实验三**

**学院： 电子与信息工程学院**

**专业： 电子信息工程**

**指导教师： 陈真**

**报告人： 余韦藩 学号： 202028510 班级： 文华班**

**实验时间： 2023.03.16-2023.03.23**

**实验报告提交时间： 2023年3月30日**

**教务部制**

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| **实验目的与要求：**  微信截图_20230329234820 |
| **内容和步骤：**   1. **Let the sampling rate be fs=2000, plot the original signal and the sampled signal**   The following figure shows the main codes of this task. The notices have been made clearly so we will not explain it in detail. In order to achieve fs=2000sampling, we just generate the same time range t but with new sample rate fs=2000. Here we use the stem function to plot the sampled signal with fs=2000.  微信截图_20230330022228  微信截图_20230330022245  The following figure shows the original signal m(t) and the sampled signal with fs=2000.  微信截图_20230330022917   1. **Plot the quantized signal (uniform quantization and the quantization level number is 32)**   The following figure shows the main codes of this task. First, we should calculate the quantization interval deta of the quantization. Then records each quantization value in the vector m. Next, we quantize each sample with the principle that if the value drops in a specific quantization range, the quantization result is (down+up)/2. Finally, we plot the quantized signal.  微信截图_20230330022844  微信截图_20230330022849  The following figure shows the original signal m(t) and the quantization signal with quantization level 32.  微信截图_20230330022907 |
| **实验结论：**  The function of sampling and quantization includes:  **Sampling:** Sampling is the process of measuring an analog signal at a specific point in time and converting it into a discrete digital value. The signal is sampled at regular intervals, and the sampling rate determines the number of samples taken per second. The goal of sampling is to capture the essential features of the signal, while minimizing the amount of information needed to represent it digitally.  **Quantization:** Quantization is the process of mapping the continuous range of analog signal values to a set of discrete digital values. This is typically done by dividing the signal range into equal intervals and assigning each interval a unique digital code. The number of quantization levels determines the resolution of the digital representation of the analog signal. The goal of quantization is to represent the analog signal as accurately as possible, while minimizing the number of digital bits needed to represent it. |
| **指导教师批阅意见：**    **成绩评定：**  **指导教师签字：**  **年 月 日** |
| **备注：** |

注：1、报告内的项目或内容设置，可根据实际情况加以调整和补充。

2、教师批改学生实验报告时间应在学生提交实验报告时间后10日内。