基于 GUI 的数字信号处理实验平台的开发

摘　要

数字信号处理这门学科理论内容较强，公式计算众多，刚刚接触的人往往难以理解，所以需要借助实验加深我们对于理论知识的理解和认知，并进行充分运用。但是因为相关理论知识具备一定的繁琐性和严谨性，所以这就意味着无法通过传统的实验方式来促进理论知识的深入。因此我们需要设计一套有针对性的实验软件仿真系统，将学科的特征充分融入进去，从而对传统的实验方式起到补充的作用。通过该实验系统，学生们可以充分直接和准确地掌握课题的计算方式，并充分了解有关理论，对知识进行系统地理解和运用。在此基础上学校在教学的过程中，也能节约大量的人力和资金，从时间和空间的角度出发促进实验的发展和优化。

本文在研究的过程中，是以 MATLAB 作为主要研究工具，通过数字信号对基础理论知识进行设计，并开发相应的实验平台。在设计的过程中，需要结合 MATLAB 软件当中所具备的工具箱函数，并将理论知识的特征充分结合起来，借助 m 程序编写的流程，将目前学生在学习中需要掌握的核心知识充分表现出来，从而提高学生在学习中的积极性和主动性。在设计实验平台时，是以 MATLAB 软件当中的用户界面作为设计工具，并设计了大量的参数和前提条件，该项目具备极强的灵活性和普遍性，由此可以对相关理论知识进行表现和验证。该平台还对音频滤噪实验项目，由此对学生的数字信号处理能力进行考核，从而对学生学到的知识进行总结和归纳，并进行最后的审核。为了充分扩展每个学生的知识储备量，并且在学习信号的计算方式时，可以充分培养学生的兴趣和爱好，此次通过该平台还设计了一个全面的滤波器，从而促进界面的有效实现，将实际操作方式和传统方式进行对比，就可以让学生充分体会到其中计算方式的重要性，并提高学生在理论知识方面的认知和理解。

关键词：数字信号处理；实验平台；MATLAB；图形用户界面

ABSTRACT

Digital signal processing is a subject of strong theoretical content, formula calculation is numerous, people who have just contacted are often difficult to understand,so we need to use experiments to deepen our understanding and cognition of theoretical knowledge,and make full use of it.However,because the relevant theoretical knowledge is cumbersome and rigorous,this means that the traditional experimental methods can not promote the depth of theoretical knowledge.Therefore,we need to design a set of targeted experimental software simulation system to fully integrate the characteristics of the subject,so as to complement the traditional experimental methods.Through the experimental system,students can fully grasp the calculation method of the subject directly and accurately,and fully understand the relevant theories,and systematically understand and apply the knowledge.On this basis,the school can also save a lot of manpower and funds in the process of teaching,and promote the development and optimization of experiments from the point of view of time and space.

During the research process,this paper takes MATLAB as the main research tool,designs the basic theoretical knowledge through digital signal,and develops the corresponding experimental platform.In the process of design,it is necessary to combine the toolbox function in the MATLAB software,and fully combine the characteristics of theoretical knowledge,with the help of the process of m programming,The core knowledge that students need to master in their study is fully demonstrated,thus improving students'enthusiasm and initiative in learning.During the design of the experimental platform,the user interface in the MATLAB software is used as the design tool,and a large number of parameters and preconditions are designed.The project has strong flexibility and universality.Therefore,the relevant theoretical knowledge can be expressed and verified.The platform also evaluates the students'digital signal processing ability,summarizes and summarizes the knowledge learned by the students,and carries on the final audit.In order to fully expand each student's knowledge reserve and fully cultivate students'interests and hobbies when learning the calculation of signals,a comprehensive filter is designed through the platform to promote the effective realization of the interface.By comparing the

practical operation mode with the traditional method,students can fully realize the importance of the calculation method and improve their cognition and understanding of theoretical knowledge.

Keywords: Digital Signal Processing;Experimental Platform;MATLAB;GUI