基于“雨课堂[CX4]+[CX]雷实验”开放创新实验

[JZ]设计探索与研究

〖WT〗

[CS][MZ）]〖HJ0〗〖HT7”〗〖HJ3/4〗

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[CS][MZ）]〖HT〗〖HT〗〖HJ〗

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〖HT5”H〗〓[CS214,125,28,0]〓摘〓要：[CS][HTSS]

基于“雨课堂+雷实验”新型智慧实验教学平台可以开展课堂及实验室之外的电子信息类课程开放实验. 利用雷实验的代表性产品A+D Lab与PC机结合，可以实现虚实相结合、线上线下相混合的开放实验教学模式，不仅能有力地支撑电子信息类课程的理论教学，也能有效拓展该类课程的实验教学. 以基于“雨课堂+雷实验”的应用型开放创新实验设计——MISIM结构器件的频率响应特性研究为例，论述了“雨课堂+雷实验”智慧实验教学平台在电子信息类课程实验教学改革中体现的特色及优势. 开展基于“雨课堂+雷实验”的实验教学改革，将助力培养电子信息类专业学生的创新思维和实践能力. 

〖HTH〗[CS214,125,28,0]关键词：[CS][HTSS]雨课堂；雷实验；电子信息；开放实验；教学改革

Exploration and research on design of open innovative experiments 

[JZ]based on Rain classroom & Lab of electronics intelligence

[CS]〖WT〗

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〖HT〗〖WT〗〖WT5BZ〗〖JZ〗(a. College of Communication Engineering; b.College of Electronic Science and Engineering, 〖JZ〗Jilin University, Changchun 130012, China) [CS214，125，28，0][WT5HZ]Abstract:[CS][WTBZ] Open experiments of electronics information courses outside the classrooms and laboratories can be performed based on “Rain classroom & Lab of electronics intelligence (LEI for short)”, which is a new type of intelligent experimental teaching platform. The typical product of LEI is A+D Lab. Combining A+D Lab with PC will lead to an open experimental teaching mode which exhibits not only the combination of virtualization and reality, but also the hybrid of online and offline teaching. Such teaching mode both powerfully supports the theoretical teaching and effectively expands the experimental teaching of electronics information courses. Taking the design of a practical type of open innovative experiments as an example, that is, research on frequency response of devices with MISIM configurations, the features and advantages of “Rain Classroom & LEI” in the experimental teaching reform of electronics information courses are expounded. The experimental teaching reform based on “Rain classroom & LEI” will facilitate developing the creative thinking and practical ability of the students who are in majors related to electronics information.

[CS214，125，28，0][WT5HZ]Key words:[CS][WTBZ] Rain classroom; Lab of electronics intelligence (LEI); Electronics information; Open experiment; Teaching reform〖HT〗

[HT5K][JY,2]［责任编辑：郭〓伟］

水质物理参量测量DIS演示虚拟仿真实验软件的设计与实现

〖WT〗

[CS][MZ）]〖HJ0〗〖HT7”〗〖HJ3/4〗

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〖HT5”H〗〓[CS214,125,28,0]〓摘〓要：[CS][HTSS]基于Python编程语言，融合数字化信息系统DIS技术，开发了水质物理参量测量DIS演示虚拟仿真实验软件，展示液体的表面张力系数、浊度、溶解氧、电导率、折射率和pH值水质物理参量的动态测量过程. 该软件分为上述6个物理参量的测量模块，每个模块中包含：实验原理、实验装置、计算公式、数据采集、水质判断等模块. 该软件运用Tkinter库创建图形化的界面，实现人机交互，采用DIS数据采集模式，将水质物理数据采集过程动态、形象、直观地进行展示. “水质物理参量测量DIS演示虚拟仿真实验”利于提升使用者的学习兴趣，加深对物理原理、实验测量、数据分析的理解. 

〖HTH〗[CS214,125,28,0]关键词：[CS][HTSS]水质检测；DIS数据采集；Python编程

Design and Realization of DIS Demo Virtual Simulation Experiment 

[JZ]Software for Water Quality Physical Parameter Measurement

[CS]〖WT〗

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[CS214，125，28，0][WT5HZ]Abstract:[CS][WTBZ] Based on python programming language and digital information system (DIS) technology, we have developed a "DIS demonstration virtual simulation experiment software for measuring physical parameters of water quality", which shows the dynamic measurement process of physical parameters of water quality such as Surface Tension Coefficient, Turbidity, Dissolved Oxygen, Conductivity, Refractive Index and pH Value of liquid. The software is divided into six physical parameters measurement modules, each module includes: experimental principle, experimental device, calculation formula, data collection, water quality judgment and other modules. The software uses Tkinter library to create a graphical interface, realizes humancomputer interaction, and uses DIS data collection mode to display the process of water quality physical data collection dynamically, vividly and intuitively.

[CS214，125，28，0][WT5HZ]Key words:[CS][WTBZ] Water quality detection; water quality physical parameters; Python programming〖HT〗

特斯拉阀性能的仿真研究

〖WT〗

[CS][MZ）]〖HJ0〗〖HT7”〗〖HJ3/4〗

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〖HT5”H〗〓[CS214,125,28,0]〓摘〓要：[CS][HTSS]通过CAD软件建立几何模型，通过COMSOL软件建立数值模型并求解，与实验结果进行对比，并通过数值模拟讨论相关参数对阀门单向流通性的影响. 研究结果表明：特斯拉阀门适用于低粘度高密度流体；本文所设计的特斯拉阀门在四阀门情况下dedicatee数能达到3.414；单阀门特斯拉阀的性能相较于多阀门更佳. 

〖HTH〗[CS214,125,28,0]关键词：[CS][HTSS]特斯拉阀；数值模拟；阀门性能；diodicity数

Simulation the performance of tesla valve

[CS]〖WT〗

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〖WT4”BZ〗〖JZ〗ZHOU Runzhong, QIAO Yujie, ZHANG Yuxiang, DAI Zhenbing

〖HT〗〖WT〗〖WT5BZ〗〖JZ〗(Institute of Physics and Electrical engineering, Sichuan Normal University, Chengdu 610101, China)[CS214，125，28，0][WT5HZ]Abstract:[CS][WTBZ] Tesla valves can work normally at various scales and have stable performance, and have wide application prospects in the field of microfluidics. In this paper, the geometric model is established by CAD software in the calculation, the numerical model is established and solved by COMSOL software, compared with the experimental results, and the influence of related parameters on the unidirectional flowability of the valve is discussed through numerical simulation. The research results show that the Tesla valve is suitable for low viscosity and high density fluids; the Tesla valve designed in this paper can reach 3.414 in the case of four valves; the performance of the single valve Tesla valve is better than that of multiple valves.

[CS214，125，28，0][WT5HZ]Key words:[CS][WTBZ] Tesla valve; numerical simulation; valve performance; diodicity number〖HT〗

用中空三棱镜测量食盐水的折射率及色散

〖WT〗

[CS][MZ）]〖HJ0〗〖HT7”〗〖HJ3/4〗

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〖HT5”H〗〓[CS214,125,28,0]〓摘〓要：[CS][HTSS]探究了食盐水对汞灯5条光谱线折射率与食盐水物质量浓度的关系，计算了不同浓度食盐水的色散关系，并绘制了相应的关系曲线，最后给出了在可见光范围内食盐水折射率与食盐水物质量浓度、光波长的二元函数关系.

〖HTH〗[CS214,125,28,0]关键词：[CS][HTSS]液体折射率；柯西色散；中空三棱镜

Use hollow triple prism to measure the refractive index

[JZ]and chromatic dispersion on salt solution[CS]〖WT〗

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Jiaotong University, Chengdu 610031, China)[CS214，125，28，0][WT5HZ]Abstract:[CS][WTBZ] Explores the relation between the refractive index on salt solution to different wavelength and its concentration, calculates the chromatic dispersion and plots corresponding curves. Finally gives the binary function of the refractive index on salt solution between the wavelength and concentration in the range of visible light.

[CS214，125，28，0][WT5HZ]Key words:[CS][WTBZ]the refractive index on liquid; Cauchy dispersion; hollow triple prism〖HT〗