

# TABLE OF CONTENTS

## 目 录

**Optimization Analysis of Six-Degree-Freedom Robot Virtual Assembly Structure**  
**(六自由度机器人虚拟装配结构优化分析)**

L. LIU, G. Z. CHEN, Y. DENG, Z. LIU..... 291

**Design of Transport Device and Its Control System for Weld-Inspection Robot in AP1000**  
**(焊缝检测机器人送入装置及控制系统的应用)**

B. L. CHENG, Z. J. ZHAO, J. RONG, W. F. LIN, X. G. GAO..... 298

**Application of Deep Sea Mobile TV Grab to Marine Geological Survey**  
**(深海移动电视抓斗海洋地质调查中的应用)**

N. YANG, X. G. REN, J. Z. WANG, C. R. XIAO..... 309

**Research on Hydraulic Control System of the Hydraulic Tong for Automatic Workover Rig**  
**(自动修井机液压大钳液压控制系统的设计研究)**

F. LIU, D. B. DONG..... 316

**Tribological Behavior of Micro-Carbon Sphere as Lubricant Additives in Olive Oil**  
**(微碳球作为橄榄油润滑添加剂的摩擦学性能的研究)**

T. Y. YANG, Z. N. GU, Y. WAN..... 328

**Design of New Non-Axial Feed Gear Honing Machine Based on PCI Control**  
**(基于 PCI 控制的新型无轴向进给齿轮珩磨样机的设计)**

L. J. YU, J. LEI, X. C. ZHANG, X. X. GUO..... 336

**Forming Technology and Performance Analysis of Headless Rivet with Double Drum Upsetting Head**  
**(无头铆钉双面鼓形镦头成形工艺与性能分析)**

J. J. LV, X. Y. ZHANG, X. H. MA, D. G. HUANG, J. X. ZANG, L. H. AN..... 344

**Research on Application of 3D Printing Technology in Maintenance of Civil Aviation Machinery**  
**(3D 打印技术在中国民航机务维修领域的应用研究)**

K. LIU, F. J. DING, J. N. TENG..... 356

**Research and Manufacture Automatic Gear Shifting of Stern Windlass**  
**(自动变速艉锚绞车研究与试制)**

Y. L. GAO, L. F. FANG..... 362

**The Impact Analysis of Metal Rubber Damper on the Random Vibration of the Aerospace Electronic Equipment**  
**(金属橡胶减振器对宇航单机随机振动的影响分析)**

Q. J. ZHU, J. CHEN, X. M. CAO, M. ZHANG, S. H. LI..... 368

**Check for Pass at Engine Failure at Multiple Parts Using Multiple Methods**  
(多个部位多种方法检查帕萨特发动机故障)

X. F. ZHANG, C. ZHANG.....376

**Simulation Analysis of Welding Process for Ring Stiffened Tubular Structure**  
(带环筋筒形结构焊接过程仿真分析)

M. H. YU, X. Y. LI, G. H. LI.....381

**Numerical Analysis of Lubrication Process in High-Speed Cam-Roller Contact**  
(高速凸轮纯滚动条件下的润滑过程分析)

Y. C. HE, J. WANG.....389

**Numerical Simulation and Hydraulic Characteristics of Moving Guide Vane in Pumped Storage Units**

(抽水蓄能电站甩负荷过渡过程中活动导叶水力特性数值模拟研究)

T. C. LI, Y. H. CHANG, K. ZHENG, M. QIAO, F. BAO, D. Q. ZHOU, Y. SHAO, D. Y. LIU, Y. CAO, L. ZHOU.....396

**Unsteady Characteristics of Hydraulic Torque of Guide Vanes of a Pump Turbine**  
(水泵水轮机导叶水力矩非定常特性研究)

Y. H. ZHANG, Y. W. ZHANG, G. R. LIU, Y. TENG, X. B. GUAN, H. G. FAN, F. N. CHEN, D. Y. LIU, Y. CAO, L. ZHOU.....409