

《中文核心期刊要目总览》收录  
Ei Compendex(核心版)收录  
百种中国杰出学术期刊  
RCCSE中国权威学术期刊

2015.20  
第31卷 VOL. 31



ISSN 1002-6819  
CN 11-2047/S  
CODEN NGOXEO

# 农业工程学报

TRANSACTIONS OF THE CHINESE SOCIETY  
OF AGRICULTURAL ENGINEERING

NONGYE  
GONGCHENG  
XUEBAO



ISSN 1002-6819



中国农业工程学会 主办

农业工程学报

二〇一五年十月

第三十一卷

第二十期

中国农业工程学会

# 农业工程学报

2015 年第 20 期 总第 271 期 (第 31 卷)

## 目次

### · 综合研究 · 关键技术 ·

近红外反射土壤含水率测量仪设计 ..... 杨 柳, 徐 榕, 雷廷武, 李建平, 欧阳天琪 (1)

### · 农业装备工程与机械化 ·

油麦兼用型气送式集排器供种装置设计与试验

..... 雷小龙, 廖宜涛, 李兆东, 曹秀英, 李姗姗, 韦跃培, 廖庆喜 (10)

玉米收获机底盘车架疲劳寿命研究 ..... 陈 志, 周 林, 赵 博, 梁学修 (19)

苎麻茎秆力学模型的试验分析 ..... 沈 成, 李显旺, 田昆鹏, 张 彬, 黄继承, 陈巧敏 (26)

致灾农业昆虫捕集滑板表面结构仿生构建与性能验证 ..... 王立新, 黄凤山, 周 强 (34)

农田地膜拉伸性能变化对缠绕式回收的影响

..... 张佳喜, 王学农, 张 丽, 喻 晨, 蒋永新, 张海春, 刘旋峰, 乔园园, 王祥金, 张珊珊, 侯书林 (41)

基于旋量理论和 Sylvester 结式法的 6 自由度机器人逆运动学求解分析 ..... 李盛前, 谢小鹏 (48)

端曲面齿轮-连杆复合机构的特性分析与应用 ..... 林 超, 何春江, 蔡志钦 (55)

小波自适应算法在车身振动主动控制中的应用 ..... 邢 峰 (62)

基于驾驶员类型识别的双离合自动变速器换挡规律研究 ..... 刘 玺, 何 仁, 程秀生 (68)

前伸式双叶片污水泵内部流场 PIV 试验 ..... 郎 涛, 施卫东, 陈刻强, 李 伟, 张德胜 (74)

### · 农业水利工程 ·

灌溉系统直动式压力调节器动力学模型与数值模拟 ..... 张 琛, 李光永 (80)

低功耗经济型区域墒情实时监测系统 ..... 蔡甲冰, 刘 钰, 白亮亮, 陈 鹤, 李 新 (88)

滴灌条件下水的硬度对滴头堵塞的影响 ..... 刘燕芳, 吴普特, 朱德兰, 张 林, 陈俊英 (95)

基于 TCR 传热原理的混凝土复合保温衬砌渠道防冻胀效果研究

..... 郭 瑞, 王正中, 牛永红, 刘铨鸿, 王 羿 (101)

北方灌区混凝土衬砌渠道断面优化及参数分析 ..... 刘 东, 胡宇祥, 付 强, 李天霄 (107)

深松条件下不同地表覆盖对马铃薯产量及水分利用效率的影响 ..... 李 荣, 侯贤清 (115)

坡面径流类型对侵蚀产沙及水沙传递关系的影响 ..... 张乐涛, 李占斌, 王彬彬 (124)

BTOPMC/SCAU 分布式流域水文模型原理和系统设计 ..... 周买春, 肖红玉, 胡月明, 刘 远 (132)

黄土丘陵区不同树龄旱作枣园细根空间分布特征

..... 李陆生, 赵西宁, 高晓东, 吴普特, 李虹辰, 凌 强, 孙文浩 (140)

## · 农业信息与电气技术 ·

基于高光谱的冬油菜植株氮素积累量监测模型

……李岚涛, 马 驿, 魏全全, 汪善勤, 任 涛, 李小坤, 丛日环, 王 振, 王少华, 鲁剑巍 (147)

基于 Rank 变换的农田场景三维重建方法…………… 翟志强, 杜岳峰, 朱忠祥, 郎 健, 毛恩荣 (157)

基于 SUSAN 角点的秧苗列中心线提取方法…………… 张 勤, 陈少杰, 李 彬 (165)

基于自适应小波偏微分方程的蝗虫切片图像去噪…………… 李 丽, 张楠楠, 梅树立, 李晓飞 (172)

基于物联网的内河小型渔船动态信息监控系统设计…………… 贺付亮, 李新科, 许 愿, 王曲苑 (178)

## · 农业生物环境与能源工程 ·

日光温室保温被保温性能影响因素的分析… 刘晨霞, 马承伟, 王平智, 赵淑梅, 程杰宇, 王明磊 (186)

基于动态广义线性模型的猪场繁殖监测系统…………… 高 翔, 王 欢, 秦宏宇, 肖建华, 王洪斌 (194)

微酸性电解水对污染轮胎表面的模拟消毒优化…………… 臧一天, 李星烁, 李保明, 曹 薇 (199)

水稻秸秆与木屑混合原料热压成型试验…………… 涂德浴, 李安心, 何贵生 (205)

玉米秸秆粉料单模孔致密成型过程离散元模拟…………… 李永奎, 孙月铢, 白雪卫 (212)

生物质气化站玉米芯飞灰的特性及其综合利用…………… 姚锡文, 许开立 (218)

## · 土地整理工程 ·

基于 High-1 卫星影像的土地整治遥感监测方法研究与实践…… 张 兵, 崔希民, 赵彦博, 袁德宝 (225)

大都市边缘区三级基本农田集中保护区分级划定及调控机制…………… 沈 悦, 严金明, 王 晨 (234)

基于 GIS 的重庆低丘缓坡土地产业转移适宜度评价

…………… 杨 伟, 廖和平, 潘 卓, 李晓华, 李 涛, 李 靖 (244)

基于空间模拟退火算法的耕地质量布样及优化方法

…………… 杨建宇, 岳彦利, 宋海荣, 汤 赛, 叶思菁, 徐 凡 (253)

## · 农产品加工工程 ·

基于三维激光扫描技术的粮食储量监测系统的设计与试验

…………… 邵 晴, 徐 涛, 吉野辰萌, 宋 男, 朱 航 (262)

便携式生鲜猪肉多品质参数同时检测装置研发…………… 孙宏伟, 彭彦昆, 林 琬 (268)

碳纳米颗粒修饰丝网印刷电极测定百合镉含量…………… 郑琦琦, 俞永华, 吴 坚 (275)

基于高光谱成像技术的灵武长枣缺陷识别…………… 吴龙国, 王松磊, 康宁波, 何建国, 贺晓光 (281)

热风-脉动压差闪蒸干燥对苹果片水分及微观结构的影响

…………… 王雪媛, 陈芹芹, 毕金峰, 高 琨, 周林燕, 吴昕烨, 吕 健 (287)

果蔬冷库进货期间货物温度稳定性的影响因素…………… 冯坤旋, 南晓红, 杨巧银, 刘晓菲 (294)

不同马铃薯品种的不同加工产品适宜性评价

…………… 杨炳南, 张小燕, 赵凤敏, 杨延辰, 刘 威, 李树君 (301)

低木质素含量棉秆皮纤维的提取和表征…………… 董 震, 侯秀良 (309)

**Transactions**  
**of the Chinese Society of Agricultural Engineering**  
**Vol. 31 No. 20 2015**  
**CONTENTS**

**• Comprehensive Research & Key Technology •**

Design of near-infrared soil moisture measuring instrument

..... *Yang Liu, Xu Rong, Lei Tingwu, Li Jianping, Ouyang Tianqi* (1)

**• Agricultural Equipment Engineering and Mechanization •**

Design and experiment of seed feeding device in air-assisted centralized metering device for rapeseed and wheat

..... *Lei Xiaolong, Liao Yitao, Li Zhaodong, Cao Xiuying, Li Shanshan, Wei Yuepei, Liao Qingxi* (10)

Study on fatigue life of frame for corn combine chassis machine

..... *Chen Zhi, Zhou Lin, Zhao Bo, Liang Xuexiu* (19)

Experimental analysis on mechanical model of ramie stalk

..... *Shen Cheng, Li Xianwang, Tian Kunpeng, Zhang Bin, Huang Jicheng, Chen Qiaomin* (26)

Surface structure biomimetic design and performance testing of slippery trapping plate used for controlling

agricultural insect..... *Wang Lixin, Huang Fengshan, Zhou Qiang* (34)

Effects of mechanical tensile properties of plastic film on plastic recycling method

..... *Zhang Jiayi, Wang Xuenong, Zhang Li, Yu Chen, Jiang Yongxin, Zhang Haichun, Liu Xuanfeng,*

*Qiao Yuanyuan, Wang Xiangjin, Zhang shanshan, Hou Shulin* (41)

Analysis of inverse kinematic solution for 6R robot based on screw theory and Sylvester resultant

..... *Li Shengqian, Xie Xiaopeng* (48)

Surface gear-connecting rod analysis and application of composite structure

..... *Lin Chao, He Chunjiang, Cai Zhiqin* (55)

Application of adaptive wavelet algorithm in active vibration control for vehicle ..... *Xing Feng* (62)

Shift schedule of dual clutch automatic transmission based on driver type identification

..... *Liu Xi, He Ren, Cheng Xiusheng* (68)

PIV experiment of flow field in sewage pump with forward-extended double blades

..... *Lang Tao, Shi Weidong, Chen Keqiang, Li Wei, Zhang Desheng* (74)

### • Soil and Water Engineering •

Dynamic model and numerical simulation of direct-acting pressure regulator for irrigation system

..... *Zhang Chen, Li Guangyong* (80)

Low-cost and low-power dissipation system to monitor soil water status in real time for areal irrigation management..... *Cai Jiabing, Liu Yu, Bai Liangliang, Chen He, Li Xin* (88)

Effect of water hardness on emitter clogging of drip irrigation

..... *Liu Yanfang, Wu Pute, Zhu Delan, Zhang Lin, Chen JunYing* (95)

Anti-frost heave effect of lining channel with concrete composite insulation based on TCR principle

..... *Guo Rui, Wang Zhengzhong, Niu Yonghong, Liu Quanhong, Wang Yi* (101)

Optimization and parameter analysis for channel cross section with concrete lining in northern irrigation district

..... *Liu Dong, Hu Yuxiang, Fu Qiang, Li Tianxiao* (107)

Effects of different ground surface mulch under subsoiling on potato yield and water use efficiency

..... *Li Rong, Hou Xianqing* (115)

Impact of runoff regimes on sediment yield and sediment flow behavior at slope scale

..... *Zhang Letao, Li Zhanbin, Wang Shanshan* (124)

Principles of BTOPMC/SCAU distributed watershed hydrological model with system design

..... *Zhou Maichun, Xiao Hongyu, Hu Yueming, Liu Yuan* (132)

Influences of stand age on root patterns in a rain-fed jujube (*Ziziphus jujube*) plantation of Loess Plateau in China

..... *Li Lusheng, Zhao Xining, Gao Xiaodong, Wu Pute, Li Hongcheng, Ling Qiang, Sun Wenhao* (140)

### • Agricultural Information and Electrical Technologies •

Monitoring models of plant N accumulation of winter oilseed rape based on hyperspectral technology

..... *Li Lantao, Ma Yi, Wei Quanquan, Wang Shanqin, Ren Tao, Li Xiaokun, Cong Rihuan,*

*Wang Zhen, Wang Shaohua, Lu Jianwei* (147)

Three-dimensional reconstruction method of farmland scene based on Rank transformation

..... *Zhai Zhiqiang, Du Yuefeng, Zhu Zhongxiang, Lang Jian, Mao Enrong* (157)

Extraction method for centerlines of rice seedlings based on SUSAN corner

..... *Zhang Qin, Chen Shaojie, Li Bin* (165)

Image de-noising of locust sections based on adaptive wavelet and partial differential equation method

..... *Li Li, Zhang Nannan, Mei Shuli, Li Xiaofei* (172)

Design of dynamic information monitoring system for small-sized fishing vessels on inland waterway based on internet of things..... *He Fuliang, Li Xinke, Xu Yuan, Wang Quyu* (178)

### • Agricultural Bioenvironmental and Energy Engineering •

Analysis on affecting factors of heat preservation properties for thermal insulation covers

..... *Liu Chenxia, Ma Chengwei, Wang Pingzhi, Zhao Shumei, Cheng Jieyu, Wang Minglei* (186)

Breeding surveillance system in pig farm based on dynamic generalized linear model

..... *Gao Xiang, Wang Huan, Qin Hongyu, Xiao Jianhua, Wang Hongbin* (194)

Simulation of disinfection optimization of vehicle tire surface using slightly acidic electrolyzed water

..... *Zang Yitian, Li Xingshuo, Li Baoming, Cao Wei* (199)

Hot pressing forming experiment of the rice straw and sawdust mixed material

..... *Tu Deyu, Li Anxin, He Guisheng* (205)

Extrusion process of corn stalk powder in single orifice die processing based on discrete element method

..... *Li Yongkui, Sun Yuezhu, Bai Xuwei* (212)

Ash properties and integrated uses of corncob fly ash from biomass gasification station

..... *Yao Xiwen, Xu Kaili* (218)

### • Land Consolidation and Rehabilitation Engineering •

Method and application of remote sensing monitoring in land consolidation based on High-1 satellite image

..... *Zhang Bing, Cui Ximin, Zhao Yanbo, Yuan Debao* (225)

Three-level concentrated prime farmland zoning and classified regulatory mechanism in suburb of metropolis

..... *Shen Yue, Yan Jinming, Wang Chen* (234)

Research on evaluation of suitability degree of industry transfer in gentle hillside Area in Chongqing based on GIS ..... *Yang Wei, Liao Heping, Pan Zhuo, Li Xiaohua, Li Tao, Li Jing* (244)

Sampling and optimizing methods of cultivated land quality based on spatial simulated annealing algorithm

..... *Yang Jianyu, Yue Yanli, Song Hairong, Tang Sai, Ye Sijing, Xu Fan* (253)

• **Agricultural Produce Processing Engineering** •

Design and experiment for grain storage monitoring system based on 3-D laser scanning technology

..... *Shao Qing, Xu Tao, Yoshino Tatsuo, Song Nan, Zhu Hang* (262)

Development of a portable device for simultaneous detection on multi-quality attributes of fresh pork

..... *Sun Hongwei, Peng Yankun, Lin Wan* (268)

Detection of cadmium content of lily by carbon nanoparticles modified screen-printed electrode

..... *Zheng Qiqi, Yu Yonghua, Wu Jian* (274)

Non-destructive detection of defects in *Zizphus jujube* Mill cv.*Lingwu changzao* based on near-infrared hyperspectral imaging

..... *Wu Longguo, Wang Songlei, Kang Ningbo, He Jianguo, He Xiaoguang* (281)

Effect of hot air-pulsed sudden decompression flashing drying on moisture and microstructure in apple slices

..... *Wang Xueyuan, Chen Qinqin, Bi Jinfeng, Gao Kun, Zhou Linyan, Wu Xinye, Lü Jian* (287)

Factors on goods temperature stability in fruits & vegetables cold storage during the loading process

..... *Feng Kunxuan, Nan Xiaohong, Yang Qiaoyin, Liu Xiaofei* (294)

Suitability evaluation of different potato cultivars for processing products

..... *Yang Bingnan, Zhang Xiaoyan, Zhao Fengmin, Yang Yanchen, Liu Wei, Li Shujun* (301)

Extraction and characterization of fibers with low lignin content from bark of cotton stalks for spinning

..... *Dong Zhen, Hou Xiuliang* (309)