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PP-166 Practical Robust State Feedback Control Design for Automatic Gantry Crane System using Particle Swarm Optimization (PSO)

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Anti-swing control is required for achieving fast motion without swing motion in automatic gantry crane system. One of the possible solutions is based on anti-swing state feedback control. However, the problem of state feedback control design is conventionally solved by pole placement or linear quadratic regulator (LQR) method via Riccati equation. Unfortunately, they involve trial-and-error approach to specify some parameters needed for the control design. In particular, there is no unified approach to specify Q and R matrices in the state feedback control design using LQR method. The selection of Q and R matrices has no direct relation with the desired time domain response. Therefore, an intelligent-based method for state feedback control design is proposed by employing particle swarm optimization (PSO) algorithm. The close loop poles are prescribed within a specified wedge region whose parameters have direct relation with the desired time domain response. By maximizing the stability radius as the objective in the optimization, the stability robustness is guaranteed in the presence of plant uncertainties. The experimental results show the effectiveness of the proposed method. The controller is able to effectively follow the reference input of trolley position while suppressing the swing of the payload for various conditions of gantry crane operations.

PP-167 Processing of Date Palm Kernel (DPK) for Production of Edible Jam

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This project involved the usage of date palm (*Phoenix dactylifera*) kernel (DPK) to be produced as an edible jam after had been grounded into powder. DPK jams was prepared by adding date palm kernel (DPK) powder, saccharose, pectin, water, citric acid, ascorbic acid and Gum Arabic. Then the experiment design for date palm kernel (DPK) for production of jam was done using the Design Expert. The design shows that there were ten types of jams to be produce according to the content of different material where the parameters such as amount of saccharose, pectin and dietary fibre from Gum Arabic were varied to give the best acceptability of the DPK jams samples. After that the jams sample produce were evaluated in terms of the sensory evaluation which includes taste, texture, aroma, appearance and overall acceptability by the ten panelist selected from students of Biochemical-Biotechnology Engineering, International Islamic University Malaysia. The samples were evaluated based on a five point hedonic scale, where one represented “disliked extremely” and five represented “liked extremely”. All the data then were analyzed by using spreadsheet Microsoft Excel. From the result showed that some of the panelists accept the product while the others reject the DPK jam samples. Finally, this report is the outcome of the research done to find the acceptability of the production of DPK jams.

PP-168 Design and Development of Magneto Rheological (MR) Damper for Active Vibration Control

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Semi-active control devices have received significant attention in recent years because they offer the adaptability of active control devices without requiring the associated large power sources.

Magneto-rheological (MR) dampers are semi-active control devices that use MR fluids to produce controllable dampers. They potentially offer highly reliable operation and can be viewed as fail-safe in that they become passive dampers should the control hardware malfunction. To develop control

algorithms that take maximum advantage of the unique features of the MR damper, models must be developed that can adequately characterize the damper's intrinsic nonlinear behavior. Following a review of several idealized mechanical models for controllable fluid dampers, a model is proposed that can effectively portray the behavior of a typical magneto-rheological damper. Comparison with experimental results for a prototype damper indicates that the model is accurate over a wide range of operating conditions and is adequate for control design and analysis.

PP-169

Development of Remote Operability CNC Milling

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Capability of remote operation of a CNC milling machine is demonstrated. Unattended machining operation is possible to be performed by executing NC program sent from remote user. The system is designed using a computer server and connected to a PC based controlled CNC machine for real time axis monitoring remote desktop. A client accesses the machine through Internet and operate and simulate the machine activity. Operability of CNC machine supported by combination between real time virtual simulation and using remote desktop tool and Setup Free Pin type Attachment. An auto setup CNC milling machine which is equipped with specially developed Setup Free Attachment has been investigated as one solution for unattended machining process. A specially designed attachment with setup free machining methodology has been developed for horizontal machining center. Attachment consists of three main equipments; material indexing device, Sub clamp with pin and vise index.

PP-174

Integrated Solid Wastes Management for KL

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Issues on pollution and waste disposal problems have posed a great challenge to manager and planner of Kuala Lumpur since the number of population and the growth of industry sector in Malaysia have been increased. The purpose of this research is to study the current solid waste management in Kuala Lumpur and to recommend as well as develop an integrated approach by using knowledge-based system. Data on solid waste disposal system and waste generated by various regions in Kuala Lumpur from Department of Environment (DOE) Malaysia, Dewan Bandaraya Kuala Lumpur (DBKL), and Alam Flora Sdn Bhd (AFSB) are collected in order to be implemented in the expert system. A programming language called Visual Basic is used since it is an ideal programming language for developing sophisticated professional applications for Microsoft Windows. In this project, the user interface on solid waste management is designed and the conceptual structure of the relational database model on "solid waste management system" is graphically summarized. The overall development of expert system has been carried out in several phases, including problem definition, knowledge acquisition, knowledge base, prototype development, prototype validation and implementation. Solid waste expert system contains sub forms which the user can obtain a comprehensive background of the current solid waste management in Kuala Lumpur. It allows the user to browse around the knowledge that has been extracted from books, published research articles, reports, and expertise who involved in solid waste management activities. User can ask for clarification, view the problems faced in solid waste management, forecast the future trend of solid waste generation and learn how to solve the problems in solid waste management.