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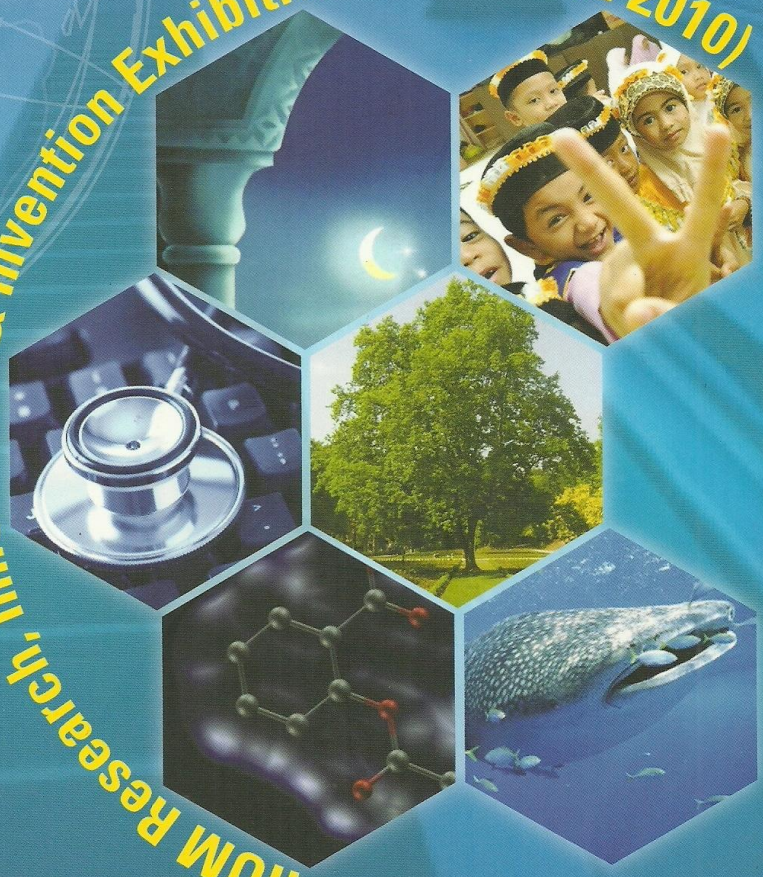

ENHANCING QUALITY RESEARCH & INNOVATION for SOCIETAL DEVELOPMENT

PP-154 Floating Porous Ceramics for High Density Cell Culture in Stirred Bioreactors

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Floating porous ceramics has been successfully developed using protein foaming-consolidation method. This method allows the control of porosity not only by the varied concentration of protein but also by managing the foaming process. Slurries of alumina powders and yolk was prepared by stirring the mixture and the resulting slip was poured into cylindrical shaped molds. Subsequently, they were subjected to drying for foaming and/or consolidation. Foaming process condition determined mean pore size and pore distribution. The dried green bodies of the samples were then burned to remove the pore creating agent followed by sintering at 1550°C for 2 h. Pore size distribution measurement showed that macropores of the sintered alumina porous bodies increased with the increased time and temperature of the drying process and were found in the range 50 - 800 μm. SEM measurement also confirmed this observation. Less foamed samples show lower shrinkage but higher compressive strength. A shrinkage of as low as 7.8% was observed for the sample dried at 110ºC but it increased significantly to 29.3% when dried at 180ºC. The compressive strength of the 110ºC's sample was 5.72 MPa at 43.6% porosity and it decreased to 4.57 MPa at 50.4% porosity when foamed at 180ºC. Density varied from 0.9 to 1.5 g/cm3 depending on the preparation condition. These results have opened a novel preparative way for porous ceramics especially alumina-based porous materials designed for biomedical applications such as cell culture in stirred bioreactor, drug delivery, bone implant etc.

PP-159 Damageless Digital Watermarking Using Complex-Valued Artificial Neural Network

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Several high-ranking watermarking schemes using neural networks have been proposed in order to make the watermark stronger to resist attacks. However, the current system only deals with real value data. Once the data become complex, the current algorithms are not capable of handling complex data. In this paper, a distortion free digital watermarking scheme based on Complex-Valued Neural Network, CVNN in transform domain is proposed. Fast Fourier Transform, FFT was use to obtained the complex number (real and imaginary part) of the host image. The complex values form the input data of Complex Back-Propagation (CBP) algorithm. Because neural networks performs best on detection, classiï¬□cation, learning and adaption, these features are employed to simulate the Safe Region (SR) to embed the watermark, thus, watermark are appropriately mapped to the mid frequency of selected coeï¬ƒcients. The algorithm was appraised by Mean Squared error MSE and Average Difference Indicator ADI. Implementation results have shown that this watermarking algorithm has high level of robustness and accuracy in recovery of the watermark.

PP-161 Intelligent Sliding Mode Control using Natural Logarithm Sliding Surface

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In automotive, engine mount is a component used to support the car engine on the chassis and at the same time isolates engine vibration. Ideally engine mount system should isolate engine vibration caused by engine disturbance force in engine speed range and prevent engine bounce from shock excitation. Nowadays, active engine mounting system has been considered as the next generation of engine mounts.

The system consists of passive mount, force generating actuators, sensors, and electronic controllers. To attenuate the vibration of the engine, it is necessary to design a controller that able to superimpose the unwanted vibration signal with a canceling signal of exactly the same magnitude and a phase difference of 1800. Different control strategy has been proposed, however most of the control approaches are model based control design in which precise mathematical model of the plant is required to be known. To design a simple and robust controller in the field of active engine mounting system, Intelligent Sliding Mode Control using Natural Logarithm Sliding Surface is proposed. It combining the advantages of adaptive, neural network and robustness, sliding mode control strategies to develop model-free control design. The effectiveness of the proposed methods is evaluated both on the simulation and experimental result to the lab-scale active engine mounting system. The results show that the proposed controllers able to suppress the vibration of the engine effectively in the band of frequency interest from 5 Hz to 30 Hz.

PP-162 Preparation of Nutritious Drink from Date Palm Kernels

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This research study was undertaken to explore the potential of use of date palm kernel (DPK) for food industry and to produce edible product, which was nutritious DPK drink. The DPK powder was examined for toxicity by using Brine Shrimp Lethality Bioassay. DPK powder was analyzed for nutritional compounds that results in protein 0.99 mg/g, glucose 0.74 g/L fructose 0.6 g/L and anther traces of simple sugars. Analysis of Mineral elements in the ash showed the average values of Cu, 0.92 mg/L; Ca, 2.04 mg/L; Fe, 0.91 mg/L; Mn, 0.43 mg/L; Mg, 4.99 mg/L and K, 6.74 mg/L. The nutritional values of the prepared DPK drinks were determined. Factorial design was used for optimization with three independent variables, which were the volume of water, amount of sucrose and citric acid. The maximum overall acceptability through the sensory evaluation test was achieved for the DPK drink formulation of 150 mL water, 30 g sucrose and 4.0 g citric acid. Analysis of the results was evaluated using Design-Expert (DX6) software by statistical tools.

PP-165 Fuzzy-based NCTF Control System of Point-to-point (PTP) Linear Positioning System

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Nominal characteristic trajectory following (NCTF) controller, which consists of an nominal characteristic trajectory (NCT) and a compensator, is a practical controller since its design is only based on a very simple open-loop experiment. The objective of the compensator in NCTF controller is to make an object motion follows the NCT and to end the motion at the origin. Its simplicity even more increased by the introduction of fuzzy compensator compared to trial and error original PI compensator. The proposed fuzzy compensator is practical since its all design parameters are based on NCT information and hardware specifications used; which are sensor resolution and actuator rated input; only. Trial and error or uncertain parameters value are completely eliminated. By using a linear positioning system, control performance of the proposed compensator and its robustness are examined experimentally using single axis linear positioning table. The results show that the proposed compensator is effective for the entire displacement range and able to force object motion as fast as determined by the NCT. Proposed compensator has consistently outperformed the PI and existed fuzzy compensators.