

## Issues in Controller Design for a class of Extended Linear Complementarity Problem

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### Abstract

A study on dynamical systems with interacting continuous and discrete components called hybrid systems. A great amount of interest has been shown in the field of modeling and controlling hybrid systems. The problem considered is to model a three tank system and to obtain the dynamics of the system at each mode for a level control process of each tank. In this paper, the complementary pair of variables of three tank system is identified to formulate as complementarity systems. In this method, the system constraints are transformed into inequalities by defining some logic statements. The complexity of the system increases with the number of tanks, which make the control of the system more difficult. Thus the model equations (differential equations and inequalities) of the three tank system are reformulated as ELCP to obtain a useful controller design. The controller design using the above modeling will yield well-posedness to the system design.

**Keywords:** LCP, ELCP, Hybrid systems.

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## Subgrade Strengthening with Geosynthetics and Non-biodegradable Wastes: A Perspective

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### Abstract

Many of the pavement failures occur due to poor subgrade. In India there are large varieties of soils that are used in the subgrade of road pavements. Soil stabilising and reinforcing technologies have been extensively used during the past few decades to strengthen the soils. The term 'reinforced soil' refers to a soil that has been strengthened by placement of reinforcing material within the soil mass in the form of strips, bars, sheets or grids (meshes). Polymeric reinforcement materials i.e. Geosynthetics have proven its use as a cost-effective geotechnical material. In 1970, there were only five or six geosynthetics available, while today more than 600 different geosynthetic products are sold throughout the world. The size of the market, both in terms of square meters produced and their value is indicative of their influence. Worldwide annual consumption of geosynthetics is close to 1000 million m<sup>2</sup>, and the value of these materials is probably close to US\$1500 million.

Fly ash, lime, cement, various types of fibers and other non-biodegradable products are also used for stabilising and strengthening of soils. Around 110 million tonnes of fly ash get accumulated every year at the thermal power stations in India. Internationally fly ash is considered as a by-product, which can be used for many applications. Fly Ash Mission was initiated in 1994 to promote gainful and environment friendly utilization of the material. One of the areas identified for its bulk utilization was in the construction of roads.

This paper discusses use of non-biodegradable wastes like fly ash, RHA, and other stabilising materials for strengthening of subgrades. The use of geosynthetics for strengthening of various soils in road subgrade is also discussed. Results and co-relation with optimum utilization of various geosynthetics used so far have also been discussed elaborately.

**Key words:** Geosynthetics, Geotextile, Geogrid, Geocell, Geomembrane, Geocomposites, Fiber reinforcement, Fly ash, RHA, Non-biodegradable Waste.

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## Study on Internal Surface Polishing of Non-Ferromagnetic Circular Tubes

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### Abstract

With the development of technology, the high surface finish is in demand for various industrial applications. Internal finishing of tubes is a challenging area in which the conventional processes create some defects such as distortion of the tube and surface defects. Magnetic abrasive machining (MAM) is one of the latest processes, which has been successfully employed for this operation. In MAM, the magnetic abrasives play major role for machining of workpiece. The different methods to produce the magnetic abrasives are either complicated or tedious and expensive, so, the magnetic abrasives are costly. The present paper highlights some of the results obtained in the direction of internal finishing of tubes with MAM using relatively cheap magnetic abrasive particles. It has been found that magnetic flux density, machining time, grit size, rotational speed of workpiece and combination of grit size and rotational speed effect material removal. While percentage improvement in surface finish (PISF) was effected by magnetic flux density, machining time, interaction of magnetic flux density and grit size and interaction of machining time and rotational speed. So, it is possible to use B.S. Emery as magnetic abrasives in MAM.

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## Some Aspects of Personality Management through Acoustics Meditation (Nada Yoga): An Analysis

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### Abstract

Meditation is an emerging tool of Human Resources Management in modern organizations. It is very much helpful in solving a number of problems of the employees as well as organizations by enhancing the overall efficiency of the both. Meditation is helpful in eradicating the interpersonal/organizational conflicts at the workplace. In this paper we have analyzed the role of Acoustics Meditation in the Personality Management considering the parameters of Arrogance, Confidence, Optimism and Patience of the subjects (20 engineering students) who volunteered to undertake the testing. It was observed that 95% of the subjects gained in terms of Arrogance relief, 90% in terms of Confidence, 70% in terms of Optimism and 85% in terms of Patience.

**Keywords:** Personality Management, Meditation, Arrogance, Confidence, Optimism, Patience, Human Resources Management.

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## Design and Development of a Multi-Utility-Device for Data Acquisition, Monitoring and Control

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### Abstract

This paper discusses design and development of a multi-purpose hardware platform which can be used for various electrical switching, monitoring and control applications. The proposed hardware has the capability to acquire electrical and non-electrical quantities such as current, voltage, frequency, temperature, speed etc, process them as per the requirement and also drive the phase-controlled rectifier needed for control of these parameters. It is thus, envisaged that the proposed hardware will be very useful for a typical electrical application demanding monitoring and control of various parameters. Effective implementation of firmware will enable the device to properly identify faults in the machines/ equipment under test. Calibration and benchmarking of various electrical machines/equipment can also be implemented around this platform.

**Keywords:** Fully controlled SCR bridge, pulse transformer circuit, zero crossing detector, data acquisition unit, communication circuit

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## An Innovative Approach for Mining Engineering Teaching

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### Abstract

Mining engineering teaching is different as compared to the other engineering teaching in particular and conventional teaching in general. This is governed by the fact that the mining engineering education requires a perfect blend of inputs from field practices and theoretical principles.

The curriculums in most of the mining institutes are designed as per the needs of the mining industries and are being frequently updated as per the prevailing trends in industry. It is observed that teaching is not adequate, primarily to develop understanding for this field oriented branch of engineering and also to hone the skills amongst the students specifically required by the mining industry. This paper attempts to suggest an indigenously developed model of teaching suited for specific needs of mining engineering education to address constraints due to absence of field simulations.

**Keywords:** Mining Engineering; Innovative teaching; 3-D visualization of mine.

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