

## MATHEMATICAL AND COMPUTER MODELLING

### **A new hybrid blind image watermarking technique for content authentication based on LWT & SVD**

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This paper proposes, a robust digital watermarking technique based on LWT (Lifting wavelet transform) and Singular value decomposition (SVD) for the protection of intellectual rights. The singular values of watermark logo are embedded into the singular values of HH subband, which is obtained by 1-level LWT on original image and then SVD. In this scheme, a Digital signature is generated by using secret key and the orthogonal matrices (U & V) which is achieved by performing SVD on watermark image for the security purpose. In the next step, the generated digital signature is embedded into the modified LL<sub>3</sub> and HH<sub>3</sub> subband which is obtained after further decomposition of LL subband by N-level LWT. On the receiver side, before extracting watermark, the digital signature is used for the ownership authentication: If the extracted signature is matched with the generated signature then the process of watermark extraction goes on otherwise is stopped. Thus, the proposed scheme achieves the high robustness against various attacks is analyzed.

**Keywords:** Lifting Wavelet Transform (LWT), SVD (Singular value decomposition), Image watermarking, Digital signature

### **A new ranking based fuzzy approach for fuzzy transportation problem**

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In the current scenario of the competitive market, the adversity on the organization finds the better method to create and deliver values and services to the customers as per customer's requirement with in optimal cost and time. The transportation model provides a robust framework to meet these challenges. For solving real life problems, there are several methods to solve transportation problem in fuzzy circumstances. In this paper, a method is suggested to solve fuzzy transportation problem in which trapezoidal fuzzy numbers represent transportation cost, availability, and demand for the product. To illustrate the proposed method, a numerical example is solved and obtained results are associated with the results of existing methods. It is observed that proposed method gives the optimal result in comparison to previously existing method and it is very easy to explain and implement in real life transportation problem for the decision maker.

**Keywords:** Competitive market, ranking method, fuzzy transportation, robust framework

### **CCRTRD-A concurrency control technique in real time replicated databases**

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Data Replication is the process of using multiple copies of data located at multiple servers to help database systems to meet the stringent temporal constraints of time-critical applications, especially Internet-based services to resource for superior availability Each copy of the data is called a replica. These aspects encourage the researchers to study the requirement for realizing the benefits of replication. Current applications such as Web-based services, electronic commerce, mobile telecommunication system use the concept of replication for their functioning. The main goal of replication [5] is to improve availability and consistency. This helps mission critical services, such as many financial systems or reservation systems, where even a short outage can be very disruptive and expensive. Therefore, the major issue is to develop efficient replica concurrency control protocols that can tolerate the overload of the distributed system. Here, a new Concurrency Control protocol (CCRTRD) has been proposed for High Priority point and firm real-time database system using Static Two-Phase Locking (S2PL) for being deadlock free. It also includes High Priority given to a cohort after receiving PREPARE message from its coordinator. Proposed protocol shows significant performance improvement over O2PL and MIRROR in decreasing execution time of the current transaction and waiting time of transactions in queue.

**Keywords:** Replicated database, Distributed real time databases systems, two-phase commit, Concurrency control

### **Nanotechnology application challenges: nanomanagement, nanorisks, nanoeducation and consumer behaviour. Review paper**

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New emerging technologies are entering the society, which makes civil society the location for moral authority. Society is about the quality of human relationships, it is where people have to accept responsibility for the consequences of their actions; it is where the nano meets the micro and the micro meets the macro issues. Society belongs to all of us and everyone has his role to play. A new way of systems thinking - nanotechnology demonstrates technology trends from perfectness to non-regularity. The removal of current contradictions between regular and non-regular systems and the corresponding nanophenomena is the way to novel processes in the development of nanosciences and nanotechnologies, education and industry, consumer society and policy making. This review is intended for nanomaterial consumers, managers, education practitioners, students-researchers, manufacturers, work health and safety practitioners, and other interested people who do not have a background in technical sciences but who need to understand the benefits and hazards of engineered nanomaterials and require guidance on managing risks associated with these.