

Appendix-I**PAPERS PUBLISHED**

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- 2 Patodi S. C., Solanki N. K. and Mehta R. J.: "Application of Fuzzy Logic in Optimum Design, Damage Assessment and Classification of Structures", Journal of New Building Materials & Construction World, New Delhi, pp. 44-49, Aug. 2003.
- 3 Patodi S. C., Solanki N. K. and Shah J. H.: "Illustrated Topology Optimization of Steel Trusses using a Soft Computing Tool", Journal of New Building Materials & Construction World, New Delhi, pp. 90-98, Sep. 2004.
- 4 Shah J. H., Solanki N. K. and Patodi S. C.: "Optimal Design of Isolated Footings Via Genetic Algorithms", Proceedings of National Conference on Structural Engineering and Mechanics, (SEM-04), BITS, Pilani, pp. 178-183, Sept. 2004.
- 5 Patodi S. C., Solanki N. K. and Shah J. H.: "Genetic Algorithm based Software Development for Optimum Design of Gantry Girders", Proceedings of National Seminar on Emerging Trends in Soft Computing based Artificial Intelligence, J N V Uni., 2004.
- 6 Patodi S. C., Panchal D. N., Mehta R. J. and Solanki N. K.: "A GA-Fuzzy Approach for Truss Configuration Optimization", National Seminar on Emerging Trends in Soft Computing based Artificial Intelligence, J N V Uni., Jodhpur, 2004.
- 7 Patodi S. C., Rochani M. G. and Solanki N. K.: "A Fast Learning ANN for Prediction of Stress Fields for Masonry in filled RCC Frames", Proceedings of National Conference on Recent Trends in Structural Engineering, Erode, May 2005.
- 8 Solanki N. K. and Patodi S. C.: "Optimal Design of Block Type Machine Foundation Using Genetic Algorithm", Proceedings of National Symposium on Structural Dynamics, Random Vibrations and Earthquake Engineering, IISC, Bangalore, pp. 249-254, July 2005.

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- 11 Rana U. H., Solanki N. K. and Patodi S. C.: "Towards Optimum Design of Different Types of Slabs using Fuzzy Logic", Proceedings of The Fifth Structural Engineering Convention–2005, IISc, Bangalore, pp. 424, Dec. 2005.
- 12 Patodi S. C., Solanki N. K. and Rana U. H.: "Optimum Design of Combined Footings using Fuzzy Logic Concept", Construction Journal of India, Ahmedabad, pp. 54-56, Dec. 2005.
- 13 Patodi S. C., Solanki N. K. and Rana U. H.: "Towards Cost Optimization of R.C.C Plane Frames using Fuzzy Logic based Approach", Journal of New Building Materials & Construction World, New Delhi, pp. 132-139, Jan 2006.
- 14 Solanki N. K. and Patodi S. C.: "A Hybrid Approach for Cost Optimization of Combined Footing", Proceedings of National Conference on Civil Engineering Systems-2006, Hyderabad, Osmania University, pp. 238-245, June 2006.
- 15 Solanki N. K., Sachdev D. V. and Patodi S. C.: "GA Aided BPNN Simulator for Structural Engineering Problems", Proceedings of National Conference on Civil Engineering Systems-2006, Osmania University, pp. 246-252, Hyderabad, June 2006.
- 16 Solanki N. K., Patodi S. C. and Rana U. H.: "A Fuzzy Logic Controlled Optimum Design of R.C.C. Grid Structure", Proceedings of National Conference on High Rise Building, Materials and Practices, IIT Roorkee, Delhi, Oct. 2006.
- 17 Patodi S. C., Bhatia R. B. and Solanki N. K.: "Topology Optimization of Space Trusses using Genetic Algorithm", Proceedings of National Conference on Current Trends in Technology (NUCON '06), Nirma University, Ahmedabad, Dec. 2006.
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- 21 Arekar V. A., Solanki N. K. and Patodi S. C.: “Topology Optimization of Continuum Structures Using Genetic Algorithm”, Proceedings of National Conference on Emerging Techniques and Development in Civil Engineering, (ETDCE-07), Govt. College of Engineering, Amaravati, March 2007.
- 22 Godhwani S. D., Patodi S. C. and Solanki N. K.: “Fuzzy Logic Based Mix Design for Pumped Concrete”, Proceedings of International Conference on Recent Developments in Structural Engineering-2007, (RDSE-2007), Manipal Inst. of Tech., Manipal, pp. 208, 30th Aug – 1st Sept 2007.
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- 24 Godhwani S. D., Patodi S. C. and Solanki N. K.: “Hybridization of Soft Computing Tools for Optimal Concrete Mix Design”, Structural Engineering World Congress (SEWC 2007), Bangalore, 02-07th Nov. 2007.
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In 1995, Mukherjee and Deshpande [49A] clearly stated that it is very difficult to use any procedural programming language for computerization of structural design process because it requires a lot of knowledge, use of past experience, rules of thumb and intuition. Even the Rule Based Expert Systems (RBES) lack the learning capability for a structural design application. It is unable to generalize the situation on its own to apply the given knowledge to an entirely new situation and it fails to incorporate the intuition. Looking at these shortcomings of procedural programming language and rule based expert systems they investigated the suitability of an Artificial Neural Network (ANN) for the initial design of structures. As the ANNs can learn through designs created by experts in the form of various parameters, they are able to capture the expert's knowledge, intuition and past experience in a generalized form. After a brief discussion of ANN, they developed a multilayer feed forward network for a problem of initial design of rectangular concrete beam by training the network using the examples generated by the optimization algorithm. The back propagation learning algorithm was used to train the network considering 8 nodes in input layer, 5 nodes in output layer and 30 nodes each in two hidden layers. A comparative study of the results obtained by the optimizer and the trained network was presented with detailed discussion on various stages of development and performance evaluation of the network. In many cases the prediction of the network was found in good agreement with the values obtained by the optimizer for a single span concrete beam problem.

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