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Paper Title: Future Surface Water Resources Sensitivity to Climate Changes Impacts

Abstract: Due to water resources limitation in most parts of Iran, it is essential to give especial attention on evaluating and managing water resources. Climate changes would significantly affect water resources in future. In this study clime change impacts on water resources has been evaluated. "Karun" as the most watery river in Iran with an annual discharge of 4927.4 MCM at the site of Karun4 dam, is selected as case study. For this purpose 28 scenarios for precipitation and temperature, by using 11 models of AOGCM (Atmosphere-Ocean Global Circulation Model) models from CCCSN (Canadian Climate Change Scenario Network) are established and downloaded for next 90 years. Scenarios are downscaled for being usable for the study region. Evapotranspiration scenarios are generated by models which are provided for the case study region. The precipitation and temperature scenarios are used as input data by the mentioned models to generate future evapotranspiration scenarios. Multivariable empirical regression models based on 30 years monthly historical recorded data are generated to predict future monthly discharge scenarios. All of the models are tested with historical data. The precipitation, temperature, evapotranspiration and discharge scenarios are taken into account to estimate future surface water resources. The study shows that there would be a reduction of 17.20% (38.63 mm/year) in precipitation and 31.51% (58 m3/s) reduction in annual discharge by the end of 2100. Also annual temperature would have a raise about 22.65% (3.82° C). River runoff would have 27.8% reduction and would cause more than 25% reduction in water surface resources.

Keywords: MCM, AOGCM, CCCSN, reduction, precipitation, Evapotranspiration.

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Paper Title: Comparative Study on Mechanical and Magnetic Properties of Porous and Nonporous Film-Shaped Magnetorheological Nanocomposites Based on Silicone Rubber

Abstract: This paper presents a comparative study on mechanical and magnetic properties of two sets, each including five samples of film-shaped magnetorheological nanocomposites (MRNCs) based on RTV silicone rubber and nano-sized carbonyl iron particles (CIPs). One set of sample was prepared by polymerization of silicone rubber with CIPs and silicone oil, while the other set obtained by filling the ammonium bicarbonate (NH4HC3), CIPs and silicone oils. Both set of samples were manufactured under isotropic condition and their microstructures was characterized by XRD and EFSEM. Porosity characteristics was measured by displacement method and porosity image analysis was applied using ImageJ and Origin Pro Software. The mechanical tensile tests was conducted using Gotech tensile strength tester and the density of samples was observed experimentally and estimated theoretically. The magnetic properties of MRNCs were practically determined using VSM test. Plateau stress induced by the applied magnetics fields and MR effects was determined. Through fabrication of film-shaped MRNCs, the samples deflections was measured against applied magnetic fields .The comparative investigation results show that porosity improve the mechanical and magnetic properties of MRNCs and porous MRNCs will be the good candidate for miniature and flexible gripper's jaws.

Keywords: Carbonyl Iron, MRNCs, Porosity, Silicone Rubber.

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Paper Title: **Simulation of Flexible Manufacturing System using Adaptive Neuro Fuzzy Hybrid Structure for Efficient Job Sequencing**

Abstract: The Flexible Manufacturing Systems (FMS) basically belongs to a category of productive systems in which the main characteristic is the simultaneous execution of several processes and sharing a finite set of resource. Analysis and modeling of flexible manufacturing system (FMS) includes priority analysis of machining jobs and machining routing for efficient profit and production. Flexible manufacturing system (FMS) job Priority calculation becomes exceptionally complex when it comes to contain frequent variations in the part designs of incoming jobs. This paper focuses on priority analysis of variety of incoming jobs into the system efficiently and maximizing system utilization and throughput of system where machines are equipped with different tools and tool magazines but multiple machines can be assigned to single operation. For the complete analysis of the proposed work, a cloud of four incoming jobs have been considered. The Jobs have been assigned the priority according to Slack per Remaining Operations. Usually the probability of incoming job priority is calculated based on three parameters based strategy. In this work an adaptive Neuro fuzzy inference system (ANFIS) is developed to calculate the priority of incoming jobs based on Slack per Remaining Operations (S/RO) parameter. Four horizontal CNC lathe machines have been utilized for this work. Therefore, in this paper, an ANFIS system is developed to generate best priority of incoming jobs. The results obtained clearly indicate the higher efficiency of the proposed work to decide the priority of the incoming jobs.

Keywords: Flexible manufacturing system (FMS), adaptive Neuro fuzzy inference system (ANFIS), Slack per Remaining Operations (S/RO), Incoming job priority.

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