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Kiran Kumari, Mamta Goyal: Analysis of heat and mass transfer in MHD squeezing flow in a channel with heat flux 1–12

Abstract–Heat and mass transfer analysis for the MHD squeezing flow between two parallel plates with porous medium is the subject of this investigation. The upper plate is squeezing toward the lower plate at a constant temperature and the lower plate is subjected to heat flux. The unsteady governing equations have been solved numerically using Runge–Kutta fourth-order method with shooting technique. The present results are compared with one previously published work and the results are found to be in a good agreement. The influences of different parameters on the velocity, temperature and concentration profiles are illustrated graphically. The skin friction coefficient is computed numerically and analyzed.

Syamantak Haldar, Swati Mukhopadhyay, G. C. Layek: Analysis of heat transfer for Casson fluid flows over a non-linear stretching sheet 13–22

Abstract–The aim of this paper is to present the heat transfer characteristics for steady boundary layer flow of a non-Newtonian Casson fluid over a non-linear stretching sheet. Using the similarity transformations the self-similar forms of the governing equations are obtained. After then the numerical solutions are found out. It is noted that the Casson parameter greatly influences the solutions of the problem. Dual solutions of the problem exist and obtained for some particular ranges of the pertaining parameters. The range of existence of dual solutions is smaller than that of single solution for both cases of Newtonian and Non-Newtonian fluids. Velocity and temperature decrease with the increasing values of non-linear stretching parameter and the temperature is found to decrease with the increasing Prandtl number. The temperature gradient is found to decrease with the decreasing values of Casson fluid parameter and also with the increasing values of the Prandtl number.

Pooja Sharma, Navin Kumar, Tarun Sharma: Entropy generation analysis of MHD free convective Kuvshinshiki viscoelastic fluid flow past an infinite vertical porous plate with heat source and thermal radiation 23–42

Abstract–The entropy generation analysis is implemented to the study of MHD free convective flow of Kuvshinshiki viscoelastic fluid past an infinite vertical porous plate immersed in the porous medium in the presence of heat source and thermal radiation. Heat dissipation is also taken in account in the study of heat transfer. Analytical solutions for velocity and temperature field are obtained and discussed for various values of physical parameters. In addition to that skin friction, coefficient and Nusselt number is also studied. Entropy generation due to heat transfer, fluid friction and magnetic field is also calculated. The effect of various parameters has been discussed and explored through graphs. The study reveals that it is possible to reduce the entropy generation by suitably decrease of the strength of magnetic field, heat source and heat dissipation.

Lukas Behun, Milan Smetana, Klara Capova: Estimation of defect geometry in eddy current nondestructive evaluation of conductive biomaterials 43–52

Abstract–This article deals with inverse problem solution in electromagnetic nondestructive evaluation (eNDE). Austenitic stainless steel (AISI 316L) is investigated with presence of the artificial notches. Eddy current inspection with commercially available probe under harmonic excitation is used for this purpose. The inverse problem solution based on concrete mathematical methods is presented to estimate the defect geometry. Obtained results are presented and discussed in the paper.

Ali Amooji: Solving of diagnostic issues with mathematical modeling approach. (Case study: Inference engine architecture in the neurological diseases diagnosing expert system) 53–56

Abstract–The paper represents a feasibility study on the usable mathematical formulas for design of inference engine of expert systems. First of all, diagnosing topic has been investigated as the main issue. In the following, medical diagnosis as the instance of diagnostic issues, has been researched. Then problem-solving algorithms are expressed in three levels of abstraction to solve the diagnosis issue. In the next step, some of the mathematical formulas that seemingly can be used, but in fact not, are also marked. Bayesian formula for calculation of occurrence probability of a hypothesis (assumption) has been surveyed. Also, utilization of this formula for calculating the probability of disease is proved with justifiable reasons.

Václav Petráš, David Pánek, Pavel Karban, Ivo Doležel, Luděk Vejvara, Isabela Bradáčová: Utilization of numerical continuation method for calculating the critical intensity of the radiant heat component 57–64

The paper deals with calculation of critical intensity of the radiant component, which is important for setting fire-dangerous area in surroundings fire open area. The algorithm is based on numerical continuation method.

Alireza Shokri Khasraghi, Jalil Mazloum: Investigating human abnormal behaviors in video using image processing techniques and one of the neural network methods 65–72

Abstract–In this paper, using the science of the day and focusing on the correct and perfect performance of the system, it has been tried to reduce the errors that before (those errors) take place. The consequence this action leads to reduction in human resources, reduction in consumption of financial resources, and above all, it leads to a sharp reduction in unrecoverable errors. To achieve the features, first, we seek to find the human object using the shadow detection and background removal in the image. In fact, the background can be eliminated by arguing the without motion pixels which are the background. In order to analyze the motions, some researchers have used the hidden Markov method and dynamic programming in real time. In the tracing section, we proceed to separate the parts of body, in which we are transferred to the next step after each part done, such as in the first layer, above of the body, down of the body and the head are indicated. In the next layer, we discuss about the behaviors that include walking, fighting, gunfire, and take the physical substance from the ground.

Khezzani Djamel, Labar Hocine, Benlahbib Boualem: Enhanced combined PI algorithm and predicted wind turbine power controller and supervisor applied for a wind farm 73–90

Abstract–Proportional integral controller algorithm is proposed for improving a wind farm based on the aerodynamic power prediction. For this reason, a combined prediction wind power with a conventional PI regulator algorithm using Artificial Neural Network (ANN) has been developed. The motivation of this study is to create a simple and robust algorithm that describes short-term wind power forecasting. A set of recent wind speed measurements obtained between the years 1995–2004 by the Algerian south station (ADRAR), are used to train and test the data set. The proposed algorithm has been successfully implemented for the powers supervision of the wind farm. The obtained results demonstrate the efficiency of the modified algorithm which given a good solution of the saturation problem at the level of wind generators.

Mohsen Irani, Faramarz Sarhaddi, Amin Behzadmehr: Numerical investigation of the effect of nanoparticles on thermal efficiency of phase change materials 91–98

Abstract–In this study, in order to examine the thermal properties of different materials, the effect of different nanoparticles (Np) in phase change materials on the heat transfer rate in the melting and freezing processes of these materials has been numerically investigated. In the present study, carbon nanotubes and aluminum oxide as an enhancement nanoparticle as well as paraffin and a combination of hydrated salts as a phase-change material have been used. The finite difference method is used based on the enthalpy method for the phase change problem for numerical solution. The simulation results indicate an increase in the heat transfer rate due to the addition of nanoparticles to the phase change material. For both of the phase change materials considered in the present study, the results show the higher efficiency of carbon nanotubes compared to aluminum oxide to increase the heat transfer rate. The highest increase compared to the base state at the speed of the processes involved the addition of carbon nanotubes to paraffin, which according to the simulation is about 30 %. The lowest increase is related to the state of aluminum oxide in the composition of hydrated salts (about 4.5 %). The results of this study can be used to determine the heat transfer speed required for storing and releasing energy.