the boundary value problem (BVP) is solved numerically using the bvp4c solver in MATLAB. This approach provides insights into the configuration of the temperature fields under different parameter settings. Following this, **a** linear stability analysis is performed to explore the effects of crucial physical parameters like non-Newtonian Rayleigh number**,** Péclet number**,** viscous dissipation parameter**,** and the ratio of relaxation to retardation times on the onset of thermal convection. The results of the stability analysis, illustrated through neutral stability curves, reveal significant insights into the influence of viscous dissipation and throughflow on convective behavior. Specifically, it is observed that an increase in viscous dissipation parameter leads to a lower threshold for the onset of convection, thereby enhancing thermal buoyancy effects within the fluid. This suggests that viscous dissipation acts as a destabilizing factor by introducing additional heat into the system. Moreover, the presence of throughflow plays a crucial role in modifying the critical conditions for convective instability, either delaying or advancing the onset of convection depending on the direction and magnitude of the imposed flow. These findings provide a deeper understanding of how non-Newtonian effects, thermal transport mechanisms, and fluid inertia interact within a porous medium, offering valuable insights for applications in geothermal systems, filtration processes, and polymeric fluid dynamics.

Keywords: Jeffrey Fluid; Throughflow; Viscous Dissipation; Thermal Convective Instability.

Abstract ID – M106

Resonances in Fractional Order Duffing System

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Abstract

The primary and secondary resonances induced in a Duffing oscillator with fractional damping, subjected simultaneously to a parametric as well as an harmonic external excitation, is analysed in present work. The standard perturbation technique used to get an approximate estimation of the dynamical complexity of the Duffing system for the case of resonance. For such a setup, the amplitude-frequency and phase-frequency equations are obtained to analyse the characteristics of primary and secondary resonances for various

parametric values. Frequency responses applicable to various engineering problems has been estimated for

(i) different fractional damping orders,
(ii) several excitation force magnitudes and
(iii) with varying nonlinearity.

Keywords: Nonlinearity; Fractional Damping; Parametric Excitation; Resonances; Frequency Response.

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The continuous wavelet transform in the terms of generalized Kontorovich Lebedev transforms

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Abstract

The paper contains study about the translation and convolution operators in the framework of generalized Kontorovich-Lebedev transforms and its relation with the inverse adjoint generalized Kontorovich-Lebedev transform. Such discussion carried out in [1, 2], in terms of Kontorovich-Lebedev transform and this is the motivation of the extension. Generalized Kontorovich-Lebedev transform was defined earlier by Mandal and Prasad and then by Diziri [4]. We extended that study in the adjoint form. Further, estimates for the translation and convolution operator have been obtained in the Lebesgue space with different measures. Continuity of the Generalized Kontorovich-Lebedev transform will be also a part of the investigation in the Lebesgue space.

Keywords: Kontorovich-Lebedev transform; Special function; Inequalities;

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Ion Size and Ion Partitioning Effects on Electroosmosis Flow of Power-Law Fluids in pH-Responsive Soft Nanochannels with Basic Functional Groups

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