

|   |           |
|---|-----------|
| <b>C41: LINEAR AND NON-LINEAR MATHEMATICAL MODEL TO PREDICT THE ONSET OF RETINAL HAEMORRHAGE .....</b>  | <b>70</b> |
| <b>C42: THE MATHEMATICS OF SCIENTIFIC COMPUTATION AS APPLIED IN BIOLOGICAL PROBLEMS (BACTERIAL CULTURE) .....</b>   | <b>71</b> |
| <b>C43: THE EFFECT OF COMORBIDITY OF DIABETES MELLITUS ON DIABETICS' POPULATION FROM A SIMPLE MATHEMATICAL MODEL .....</b>  | <b>72</b> |
| <b>C44: PARAMETER WITH THE GREATEST IMPACT ON THE MATHEMATICAL MODEL OF TRANSMISSION DYNAMICS OF SARS – COV – 2 (COVID – 19) WITH VACCINE PREVENTIVE MEASURES AMONG NIGERIAN POPULACE .....</b> | <b>72</b> |
| <b>C45: MATHEMATICAL MODEL SHOWING PREVENTIVE MEASURE AS A KEY TO REDUCING CORONAVIRUS DISEASE 19 (COVID-19) SPREAD .....</b>   | <b>73</b> |
| <b>C46: MATHEMATICAL ANALYSIS OF A CO-INFECTION MODEL FOR HPV-SYPHILIS .....</b>  | <b>74</b> |
| <b>C47: MATHEMATICAL MODEL FOR THE TRANSMISSION DYNAMICS AND CONTROL OF HIV/AIDS INCORPORATING DRUGS RESISTANT COMPARTMENT .....</b>  | <b>74</b> |
| <b>C48: MODELLING AND SIMULATION OF HBV DISEASE WITH INFECTIOUS LATENT .....</b>  | <b>75</b> |
| <b>C49: A PERIODICALLY-FORCED MATHEMATICAL MODEL FOR SEASONAL DYNAMICS OF LASSA FEVER IN NIGERIA .....</b>  | <b>75</b> |
| <b>C50: MATHEMATICAL MODEL SHOWING PREVENTIVE MEASURE AS A KEY TO REDUCING CORONAVIRUS DISEASE 19 (COVID-19) SPREAD .....</b>   | <b>76</b> |
| <b>C51: PARAMETER WITH THE GREATEST IMPACT ON THE MATHEMATICAL MODEL OF TRANSMISSION DYNAMICS OF SARS – COV – 2 (COVID – 19) WITH VACCINE PREVENTIVE MEASURES AMONG NIGERIAN POPULACE .....</b> | <b>77</b> |
| <b>C52: ESTIMATING THE IMPACTS OF CONTROL MEASURES FOR A TYPHOID FEVER UNDER SOCIO-ECONOMIC CONDITIONS .....</b>  | <b>78</b> |
| <b>C52: A MATHEMATICAL MODEL FOR THE FERTILITY DYNAMICS OF A FARM FIELD .....</b>   | <b>78</b> |
| <b>C53: STABILITY ANALYSIS OF PNEUMONIA INFECTION MODEL WITH SCREENING, TREATMENT AND VACCINATION .....</b>   | <b>79</b> |
| <b>C54: MATHEMATICAL MODELING AND OPTIMAL CONTROL APPLICATION ON LASSA FEVER DISEASE WITH THE CONTROLS OF VACCINATION, EARLY DIAGNOSIS AND RODENTICIDE .....</b>                                | <b>79</b> |
| <b>C55: STOCHASTIC SIR HOUSEHOLD EPIDEMIC MODEL WITH MISSPECIFICATION AND MISCLASSIFICATION .....</b>   | <b>80</b> |
| <b>D: Fluid Dynamics and Other Flow models.....</b>   | <b>81</b> |
| <b>D1: MHD NATURAL CONVECTION FLUID FLOW BETWEEN TWO INFINITELY VERTICAL POROUS PLATES IN THE PRESENCE OF INDUCED MAGNETIC FIELD WITH HEAT SOURCE EFFECT .....</b>                              | <b>81</b> |
| <b>D2: UNSTEADY GENERALIZED COUETTE FLOW IN A HORIZONTAL CHANNEL WITH SUDDEN APPLICATION OR REMOVAL OF A POROUS MATERIAL.....</b>   | <b>82</b> |

|  |           |
|--|-----------|
| <b>D3: MAGNETIC FIELD EFFECT ON TIME PERIODIC NATURAL CONVECTION FLOW IN A VERTICAL MICROANNULUS WITH HEAT SOURCE/SINK .....</b>                             | <b>82</b> |
| <b>D4: ANALYSING CHEMICAL AND MECHANICAL HEAT SOURCES IN THERMAL EXPLOSION .....</b>   | <b>83</b> |
| <b>D5: EFFECT OF RADIATIVE HEAT TRANSFER ON MHD FLOW WITH VARIABLE VISCOSITY AND THERMAL CONDUCTIVITY OVER A STRETCHING SURFACE .....</b>                    | <b>84</b> |
| <b>D6: MATHEMATICAL MODELING FOR PREDICTING FIRE SPREAD IN A REAL-TIME COUPLED ATMOSPHERIC-WILDLAND FIRES .....</b>  | <b>84</b> |
| <b>D7: A SEMI – ANALYTICAL SOLUTION OF ONE - DIMENSIONAL CONTAMINANT FLOW PROBLEM INCORPORATING THE ZERO ORDER SOURCE PARAMETER.....</b>                     | <b>85</b> |
| <b>D8: ANALYTICAL STUDY OF THE EFFECTS OF CHANGE THE DECAY PARAMETER IN THE CONTAMINANT FLOW MODEL UNDER THE NEUMAN BOUNDARY CONDITIONS .....</b>            | <b>85</b> |
| <b>D9: IMPACT OF CHANGE IN ZERO ORDER SOURCE PARAMETER ON THE FATE OF CONTAMINANT IN A FLOW OF ONE-DIMENSION VIA A HOMOGENEOUS POROUS MEDIUM .....</b>       | <b>86</b> |
| <b>D10: STEADY STATE TWO DIMENSIONAL FLOW OF A HYDRODYNAMIC SECOND GRADE FLUID AND HEAT TRANSFER WITH SORET AND DUFOUR EFFECTS.....</b>                      | <b>86</b> |
| <b>D11: THERMO-DIFFUSION EFFECTS ON HEAT AND MASS TRANSFER OF MAGNETOHYDRODYNAMICS FLUID FLOW IN POROUS MEDIA .....</b>                                      | <b>87</b> |
| <b>D12: ANALYSIS OF LEAKAGE OF NON-VISCOUS FLOW IN A PIPE USING METHOD OF PRESSURE DROP.....</b>   | <b>87</b> |
| <b>D13: AVAILABILITY MODELLING AND EVALUATION OF A SERIAL FULL CAPACITY EXTRUDER MACHINE .....</b>   | <b>88</b> |
| <b>D14: DERIVATION AND ANALYTICAL SOLUTION OF MATHEMATICAL MODELS VIA DECAY SUBSTANCE, HEAT PROBLEM AND ELECTRICAL CIRCUIT USING BERNOULLI METHOD .....</b>  | <b>88</b> |
| <b>D15: OSCILLATORY FLOW IN A VERTICAL DOUBLE-PASSAGE CHANNEL .....</b>  | <b>89</b> |
| <b>D16: MODELING HEAT AND MASS TRANSFER OF A CONVECTIVE-DIFFUSION TEXTILE DRYING PROCESS.....</b>  | <b>89</b> |
| <b>D17: FLOW-INDUCED MURMURS IN THE VASCULATURE AND CARDIAC VALVES .....</b>   | <b>90</b> |
| <b>D18: G-JITTER INDUCED NATURAL CONVECTION FLOW BEHAVIOUR IN EXISTENCE OF LORENTZ FORCES IN A VERTICAL MICROCHANNEL.....</b>                                | <b>90</b> |
| <b>D19: A THREE LAYERED PULSATILE MAGNETOHYDRODYNAMIC (MHD) THIRD GRADE BLOOD FLOW IN A STENOSED ARTERY .....</b>  | <b>91</b> |
| <b>D20: ROLE OF HYDRAULIC CONDUCTIVITY ON GROUNDWATER FLOW IN RIVERBANK FILTRATION SYSTEM .....</b>  | <b>91</b> |
| <b>D21: EFFECT OF THERMAL AND SOLUTAL GRASHOF NUMBERS ON UNSTEADY MHD COUETTE FLOW THROUGH A PARALLEL POROUS PLATE WITH CONSTANT PRESSURE GRADIENT .....</b> | <b>92</b> |

investigated. Also the inform of the frictional contribution on the rate of reaction and ignition time have been investigated.

**Keywords:** Thermal Explosion, Internal friction, ignition time, Semenov Parameter. Stationary theory, Frank-Kamenetskii.

#### **D5: EFFECT OF RADIATIVE HEAT TRANSFER ON MHD FLOW WITH VARIABLE VISCOSITY AND THERMAL CONDUCTIVITY OVER A STRETCHING SURFACE**

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##### **Abstract**

An analysis has been carried out to discuss the nonlinear MHD, steady, two dimensional, laminar boundary layer flows with heat transfer characteristics of an incompressible, viscous, electrically conducting and radiating fluid with variable viscosity over a surface stretching with power-law velocity in the presence of a variable magnetic field and nonlinear radiation effects. The fluid is assumed to be a gray, emitting, absorbing but non-scattering medium. Governing nonlinear partial differential equations are transformed to nonlinear ordinary differential equations by utilizing suitable similarity transformation. Then the resulting nonlinear ordinary differential equations are solved numerically using the Nachtsheim-Swigert iteration shooting technique for satisfaction of asymptotic boundary conditions by Runge-kutta fourth order method. The numerical results for velocity and temperature distribution are obtained for different values of viscosity measuring parameter, velocity exponent parameter, magnetic interaction parameter, surface temperature parameter, radiation parameter and Prandtl number. Values for skin friction coefficient and dimensionless rate of heat transfer are also obtained numerically for variation of physical parameters.

**Keywords:** Nonlinear Radiation, MHD flow, Stretching surface, power-law velocity & variable viscosity.

#### **D6: MATHEMATICAL MODELING FOR PREDICTING FIRE SPREAD IN A REAL-TIME COUPLED ATMOSPHERIC-WILDLAND FIRES**

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##### **Abstract**

This paper presents a mathematical model for predicting fire spread in a real-time coupled Atmospheric-wild land fires. The model equations are solved analytically using direct integration and eigenfunction expansion technique. The results of the simulation are presented graphically using MAPLE package and discussed. It is observed that the parameter involved played a crucial role in the propagation of wild land fires.

**Keywords and Phrases:** Wildland, Fire spread, Crown fires, Prediction, Combustion

#### **D7: A SEMI – ANALYTICAL SOLUTION OF ONE - DIMENSIONAL CONTAMINANT FLOW PROBLEM INCORPORATING THE ZERO ORDER SOURCE PARAMETER**

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##### **Abstract**

A semi – analytical study for a time dependent one – dimensional advection – dispersion equation (ADE) with Neumann homogenous boundary conditions for studying contaminants flow in a homogenous porous media is presented. The governing equation which is a partial differential equation includes terms like advection, hydrodynamic dispersion, and first order decay processes incorporating a zero order source effects. The velocity of the flow is considered exponential in nature. The solution was obtained using Eigen function expansion technique after a suitable transformation. The results which investigate the effect change in the parameters on the concentration were discussed and represented graphically. The study revealed that as the zero order source coefficient increases, the contaminant concentration decreases.

**Keywords:** Contaminants, zero order source, advection, dispersion, homogenous, Eigen functions.

#### **D8: ANALYTICAL STUDY OF THE EFFECTS OF CHANGE THE DECAY PARAMETER IN THE CONTAMINANT FLOW MODEL UNDER THE NEUMAN BOUNDARY CONDITIONS**

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##### **Abstract**

The advection-dispersion equation is commonly employed in studying solute migration in a flow. This study presents an analytical solution of a two-dimensional advection-dispersion equation for evaluating groundwater contamination in a homogeneous finite medium which is initially assumed to be contaminant free. In deriving the model equation, we assume that there