SMT. RADHABAI SARDA ARTS, COMMERCE AND SCIENCE COLLEGE, ANJANGAON SURJI

DEPARTMENT OF MATHEMATICS

INTERNAL ASSESSMENT

SESSION 2023-2024

SEMINAR / PROJECT ASSIGNMENT

Name of the Students :- Mayuri Gopal Rao Dalit

Class: B.Sc. II Semester:- III

Subject :- Mathematics

Paper:- VI

Title of Seminar/ Project:- Applications of Differential Equations in Medical field

GUIDED BY:-

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Application of Differential Equations in Medical Field.

Introduction :-

Mathematically, a Differential Equation (DE) has represented the relationship between one or more functions with their derivatives. In which physical quantities have been represented by functions and rate of change has represented by derivatives.

DE has been considered as the most interesting research topic in recent decades. PDEs could be implemented in medical imaging, electrical signalling of nerves, proper distribution of oxygen to the healing tissues, and more. For few intricate issues the fractional PDE could be more precise than Integer Order PDE. In biological science, mathematical modelling over infections diseases by using fraction ODE have obtained more attention in past few years. Numerous mathematical model of diseases have been represented through a scheme of non-linear ODE.

Utilization of Differential Equation in Medical Field.

A series - based method which has named DTM (Differential Transform Method) has been used for resolving the DE in Bio fluid problems in the existing paper. The formulation of the problem in the paper has been modelled based on the circumstances in which the patients has been fighting from renal disease

because of the blockage of Semi-permeable Membrane in Haemodialysis. In the study Eigenvalues have been calculated with various Sherwood membrane, Paclet numbers, axial dien. angles and radius in the purview of DTM. The outcomes has revealed that the angular displacement has been the essential parameter that might be preserved as an indicator for the purity in the medical terms of the of the blood.

Implementation of DE in Cardiology :-

In cardiology, DE have been used to obtain the exact analytical values, Therefore, the suggested paper reviewed that by investigating fractional, time & PDE at various stages, action potential dynamics in cardiac tissue can be understood better. The main objectives of the existing paper is to solve the models has been recently considered to elcuidate the health related & biological process especially in dynamics of cardiac phenomena. By using the current paper, it has observed that more data and information have been required for assessing the performace of derived models. which includes clinical and experimental comparison with formal cardiac model.

* Employment of DE in pathology :-

In objective of the existing study is to provide a new modular implementation that has merged the better features of a continnum mechanics, agent based model. and particle tracking method. The existing study has been used to manage the multistage nature of the adaption phenomena. A common rationale of the method has viewed that the MM has been defined the famous PDE. The paper has utilised a techinque which has been dependent completely on fixed grid & PDE. A keystones of the method could be that explicitation of the fluid-

ystic interface interaction where the model has been malgamated into the pair of coupled PDEs. In order to build the method, the incompressible Navier stokes system has been written as :- $\rho.\partial v/\partial t + (v.\nabla)v = -\nabla P + \mu v + F - \gamma(v)$. $v = 0$.

Use of DE In Cancer Therapy :-

The striving function of Reactive oxygen species (ROS) has been acting as critical sencondary messengers in cancer & also in the process of cancer chemotherapy. Mathematical model has been used for greater understanding of vigorous frameworks in cancer progression, to predict chemotherapy responses and to optimize the protocols for drug dosage. In the existing study, dynamics of N species has been described through the developedment of ODE such as. [ROS]1(t), [ROS]2(t)..... [ROS]N(t), for each of time. The Ros species, production and decay terms have been used for governing the dynamics, Pi(t) & Di(t), where I = 1, 2, 3 ... N & t refers to time. The Based on the time history and time instant, cancer chemotherapy effect model has been changed and in order to develop efficient model fractional calculus has been used. Further, it has been also used for other non-linear PDE with dynamics fractional order.

Conclusion :-

In this review, it is evident that in medical stream, the application of DE is more important for diagnosis, analysis, interpretation & treatment of various disease. It is also observed that, in medical field, mathematical findings. ~~are~~. The review paper will act as a guide for future analysis of application of DE in medical field.

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~~SEMINAR~~ / ~~PROJECT~~ ASSIGNMENT

Name of the Students :- Payal Suresh There

Class: B.Sc. III **Semester:-** VI

Subject :- Mathematics

Paper:- XII (Special Theory of Relativity)

Title of Seminar/ Project:- Types of Sets

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Types of Sets -

1) Empty Set - A set containing no element is called an empty or null set and is denoted by the symbol ϕ or $\{\}$ or void set.

e.g. - $A = \{x | x \in N, 1 < x < 2\} = \{\}$ Here $n(A) = 0$

2) Singleton Set - A set containing only one element is called a singleton set.

e.g - let A be a set of all integers which are neither positive or negative

$\therefore A = \{0\}$, Here $n(A) = 1$

3) Finite Set - The empty set which contain finite number of object is called a finite set.

e.g - Set of letters in the word 'BEAUTIFUL'

$A = \{B, E, A, U, T, I, F, L\}$, $n(A) = 7$

4) Infinite Set - A set which is not finite is called infinite set.

e.g. - Set of natural numbers, set of rational numbers.

5) Subset - A set A is said to be a subset of set B if every element of A is also an element of B and we write $A \subseteq B$.

6) Superset - If $A \subseteq B$, then B is called a superset of A and we write $B \supseteq A$.

7) proper subset - A non empty set A is said to be a proper subset of the set B and at least one element of B is not in A. i.e If $A \subseteq B$ and $A \neq B$ then A is called a proper subset of B and write $A \subset B$.

e.g. - let $A = \{1, 3, 5\}$ and $B = \{1, 3, 5, 7\}$ then every element of A is an element of B but $A \neq B$.

$\therefore A \subset B$ i.e. A is a proper subset of B.

8) Power Set - The set of all subset of a given set A is called the power set of A and is denoted by $P(A)$. thus every element of power set A is a set.

e.g. - consider the set $A = \{a, b\}$, let us write all subset of the set A.

We know that ϕ is a subset of every set, so ϕ is a subset of A. Also $\{a\}, \{b\}, \{a, b\}$ are also subset of A.

Thus the set A has in all four subset viz, $\phi, \{a\}, \{b\}, \{a,b\}$

$\therefore P(A) = \{\phi, \{a\}, \{b\}, \{a,b\}\}$

9) Equal Set - Two set are said to be equal if they contain the same element. i.e. IF $A \subseteq B$ & $B \subseteq A$.

e.g. - let x be the set of letters in the word 'ABBA' and Y be the set of letter in the word 'BABA'.

$\therefore X = \{A, B\}, \# Y = \{B, A\}$,

Thus the set x and Y are equal set & we denote it by $X = Y$.

10) Equivalent Set - TWO finite set A & B are said to be equivalent if $n(A) = n(B)$

e.g. - $A = \{d, o, m, e\}$, $B = \{r, a, c, k\}$

$n(A) = n(B) = 4$

$\therefore$ A & B are equivalent set.

11) Universal set - IF in a particular discussion all set under consideration are subset of set, say U, then U is called the universal set for discussion.

eg. - The set of natural number N, the set of integer Z are subset of real number R. thus for this discussion R is universal set.

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SEMINAR / PROJECT ASSIGNMENT

Name of the Students :- Ku. Tanushri Arvind Gathe

Class: B.Sc. III **Semester:-** VI

Subject :- Mathematics

Paper:- Maths-XI - Linear Algebra

Title of Seminar/ Project:- Type of Network Topology

GUIDED BY:-

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Types of Network Topology.

In computer Network, there are various ways through which different components are connected to one another. Network Topology is the way that defines the structure, and how these components are connected to each other.

The arrangement of a network that comprises nodes and connecting lines via sender and receiver is referred to as Network Topology.

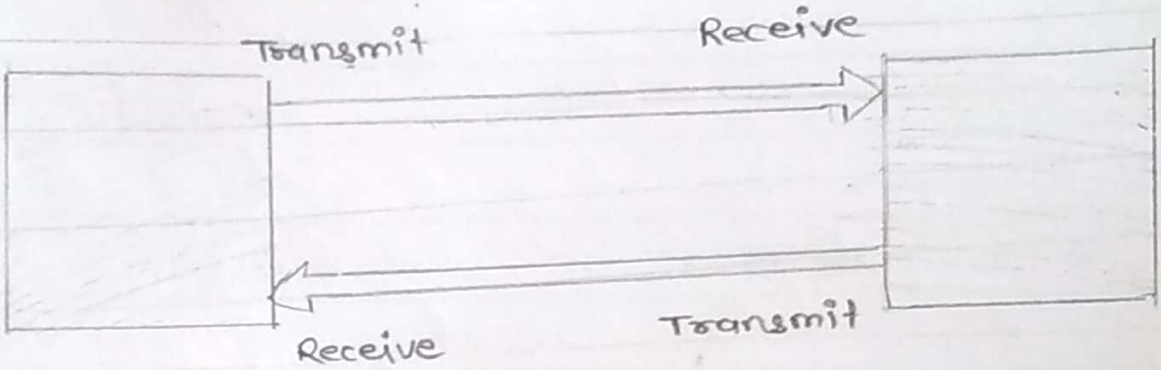
The various Network Topology are:

- point to point Topology
- Mesh Topology
- Star Topology
- Bus Topology
- Ring Topology
- Tree Topology
- Hybrid Topology.

point to point Topdogy:

point-to-point Topology is a type of topology that works on the functionality of the sender and receiver. It is the simplest communication between two needs, in which one is the sender and the other one is the

receiver. point-to-point provides high bandwidth.



Mesh Topology.

In a mesh a Topology, every device is connected to another dievice via a particular channel. In Mesh Topology, the protocols used are AHCP (Ad Hoc configuration protocols), DHCP (Dynamic Host Configuration protocol), etc.

Star Topology

In star Topology, all the device are connected to a single hub through a cable this hub is the central node and all other nodes are connected to the central node. The hube can be passive in nature, i.e, not an intelligent hub such as broadcasting devices, at the same time the hube can be intelligent known as an active hub. Active hubs have repeaters in them. coaxial cable, or RJ-45 cables are used to connect the computers. In star Topology many popular Ethernet LAN

protocols are used as CD (collision Detection), CSMA) Carrier sense Multiple Access).

Bus Topology:

Bus Topology is a network type in which every computer and network device is connected to a single cable. It is bi-directional. It is a multipoint connection. and a non-robust Topology because if the backbone fails the topology because if the backbone fails the topology crashes. In Bus Topology, various MAC (Media Access control) protocols are followed by LAN ethernet connections like TDMA, Pure Aloha, CDMA, Slotted Aloha, etc.

Ring Topology:

In a Ring Topology in forms a ring connecting devices with exactly two neighboring devices.

A number of repeaters are used for Ring topology with a large number of nodes.