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FLOW THROUGH POROUS MEDIA: LATEST DEVELOPMENTS

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ABSTRACT
An investigation has been done on "Flow through Porous Media". The study is divided into 4 sections, namely, (1) Fluid Dynamics (2) MHD (3) Flow through Porous Media, and (4) Literature Review. First three sections give a brief idea about the topic along with their basic features and possible applications. Fourth section is dedicated to a brief literature review of the relevant studies carried out by different investigators in recent times.References were presented at the end of the study. Such a compact study will help readers to gain an understanding of various flows through porous media and build interest in this field of science.

Keywords: MHD, Porous Media

1. FLUID DYNAMICS

The branch of science that is concerned with the study of fluid motion or that of bodies in contact with fluids is Fluid Dynamics or Hydrodynamics. Liquids and gases are known as fluids. Except for the operation of heavy powers, the former are not sensibly compressible, whereas the latter are readily compressible and extend to fill every closed room.

It is well-known that matter consists of molecules or atoms that are often in a random motion state. The study of individual molecules is neither required nor suitable for the use of mathematical methods in fluid dynamics. Thus, we consider the fluid's macroscopic (bulk) behavior by assuming that the fluid is continuously distributed in a given space. This statement is known as the theory of a continuum. This continuum definition of matter makes it possible for us to indefinitely subdivide a fluid part. In addition, we describe a particle of fluid as the fluid within the physically infinitesimal volume contained.

2. MHD

Magneto-hydrodynamics or MHD is the branch of science concerned with studying the magnetic properties of electrically conducting fluids (MHD). Examples of magneto-fluids are plasmas, molten metals, saltwater and electrolytes. The word "Magneto-hydrodynamics" is the combination of movement meaning magneto-meaning magnetic field, water meaning hydro, and dynamics. The concept of MHD was first suggested by Hannes Alfven, for which he received the Nobel Prize in 1970.

Magneto-hydrodynamics occurs as a result of interaction between the magnetic field and the electrically conducting fluid that flows through it, i.e. current is produced when an electrically conducting fluid flows in the presence of the magnetic field and a force, called Lorentz force, is generated by the resulting current and the magnetic field together that opposes the fluid's motion. The newly created electric current produces its own magnetic field, known as the induced magnetic field, which disturbs the initial magnetic field.

2.1 APPLICATIONS OF MHD

MHD is applied to Astrophysics, which includes stars, space in between the planes, space between the stars and jets. Most of the astrophysical systems are not in thermal equilibrium, so they need an additional kinematic treatment to narrate all the processes within the system. Sunspots are formed are formed due to sun's magnetic field. Solar wind is also influenced by MHD. The solar rotation caused due to the long term effect of magnetic drag at the poles of the sun. MHD is used for engineering concerns, such as plasma confinement, nuclear reactor cooling, electromagnetic casting, etc. Magneto-hydrodynamic sensors are used in aerospace engineering to measure angular velocities. Below the earth's mantle the core lies which made up of the solid inner core and the liquid outer core. Both contain quantities of iron. The outer core moves in