World Academy of Science, Engineering and Technology
International Journal of Physical and Mathematical Sciences
Vol:17, No:12, 2023

Analytical Investigation of Viscous and Non-Viscous Fluid Particles in a Restricted Region Using Diffusion Magnetic Resonance Imaging Equation

Authors : Yusuf, S. I., Saba, A., Olaoye, D. O., Ibrahim J. A., Yahaya H. M., Jatto A. O

Abstract : Nuclear Magnetic Resonance (NMR) technology has been applied in several ways to provide vital information about petro-physical properties of reservoirs. However, due to the need to study the molecular behaviours of particles of the fluids in different restricted media, diffusion magnetic resonance equation is hereby applied in spherical coordinates and solved analytically using the method of separation of variables and solution of Legendre equation by Frobenius method. The viscous fluid considered in this research work is unused oil while the non-viscous fluid is water. The results obtained show that water begins to manifest appreciable change at radial adjustment value of 10 and Magnetization of 2.31191995400015x1014 and relaxes finally at 2.30x1014 at radial adjustment value of 1. On the other hand, unused engine oil begins to manifest its changes at radial adjustment value of 40 and Magnetization of 1.466557018x1014and relaxes finally at 1.48x1014 at radial adjustment value of 5.

Keywords : viscous and non-viscous fluid, restricted medium, relaxation times, coefficient of diffusion
Conference Title : ICMPDS 2023 : International Conference on Mathematical Physics and Dynamical Systems
Conference Location : Cairo, Egypt
Conference Dates : December 18-19, 2023

Open Science Index, Physical and Mathematical Sciences Vol:17, No:12, 2023 publications.waset.org/abstracts/168225.pdf