Modelling and simulation of the Fiber Optic Gyroscope (FOG) in measurement-while-drilling (MWD) processes

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Abstract: Gyroscopes are sensors that are used to determine angular velocity and position. Normally, magnetometers are used in horizontal drilling processes in oil industry to determine the azimuth of bottom hole assembly (BHA). Using magnetometers has some shortcomings in measuring earth's magnetic field due to downhole ore deposits; drill string-induced interference and geomagnetic influences. To overcome these problems, we propose using Fiber Optic Gyroscope (FOGs) as a better alternative in measurement-while-drilling (MWD) processes for determining the azimuth of the BHA. Computer modelling and simulation confirm that the FOG could result in a better accuracy and performance considering the severe downhole conditions.

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