

## Drill-String Dynamics in a Curved Borehole with Advancing Penetration

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**Abstract:** The dynamics of rotary drilling system with a drag bit are studied in a non-vertical borehole configuration. The model, based on the theory of Cosserat rods, accounts for axial, flexural, and torsional effects. Also, the bit-rock interaction process is included, considering both frictional contact and the cutting process, which lead to a set of delay differential equations. The novelty of this work relies in the implementation of the aforementioned bit-rock interaction model to deal with the dynamics of the drill-string in a curved borehole geometry. The advancing motion of the column penetrating into the the pre-imposed geometry of the well is also taken into consideration.