

is operated in a highly unpredictable environment for an extended period of time.

The flatness based control solution of case study 2 is used to model a rest to rest maneuver. It should be noted that external friction/ damping force is not affecting the under actuated disc. Here again, the positions and velocities of the actuated and under actuated parts are not synchronized and are widely different at the time of application of the control law. Such a situation in the rotary drilling will induce torsional vibration because of the friction developed at the drill bit by the bore hole and could result in more severe phenomena like backward whirl.

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8. Conclusion and Scope of Future Work

From the above analysis, it can be concluded that the physical causes inducing drill bit whirl can be overcome only by using other physical solutions; like new drill bit designs or dampers near the BHA [5, 8, and 9]. Research is underway to analyze control techniques to minimize the effect of the vibration aggravating sources like drill bit- bore hole friction, sudden / hard obstacles, etc.

9. References

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