Abstract

Application of estimation and monitoring in drilling industry has found a wide-spread attention among researchers. One of the main areas relates to the efficient supervision and control of drilling operations. For instance, during drilling oil wells, a fluid is pumped into drill string. This fluid is circulated through drill pipe and drill bit to bottom of the well and then is directed to the surface via annulus to transfer cutting material, meanwhile, cooling and lubricating the drilling devices located at the bottom of well. This causes the pressure between the drilling fluid and formation to be varied, leading to kick phenomenon and ultimately resulting into probable blow out if it is left uncontrolled. Therefore, estimation and monitoring of bottom hole pressure is treated as a necessary requirement during well drilling operations [2], [3]. In this paper, we are interested to investigate the feasibility of using adaptive observer technique to realize monitoring of drilling operations in oil wells from the essential and critical operational problem views, being considered in the work. The resulting developed estimation and monitoring systems will be implemented and evaluated in simulation environment on the basis of accessible operational data from candidate oil wells.

References

The Estimated Formation Pressure During Drilling Operations, in Drilling Wells, and an Exploration of Steps towards Efficient Drilling

- J. Zhou, O. N. Stamnes, O. M. Aamo, G. O. Kassa, 2010, "Pressure Regulation with Kick Attenuation in a Managed Pressure Drilling System"; The 48th IEEE Conference in Decision and Control, Shanghai, P. R. China.

**Index Terms**

- Computer Science
- Control Systems

**Keywords**

- Estimation
- Drilling Operation
- Bottomhole Pressure
- Adaptive Law
- Lyapunov Law