

عنوان مقاله:

Second Order Sliding Mode Observer Based on Super-twisting Algorithm for Dynamically Tuned Gyroscope

محل انتشار:

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خلاصه مقاله:

Dynamically Tuned Gyroscope (DTG) has primarily been advanced as small volume, low-cost, ability to sense rate in two-axis which is mostly used in the navigation application. In many navigation sensors, attaining to the best accuracy/performance is inevitably the most imperative matter. Different factors such as controller type, model uncertainties and signal to noise ratio directly affect on sensor quality. In this paper, the purpose is to access to the better performance in the response of the DTG. Aside from controller, accomplishing to the best performance of the DTG is the purpose in the presence of output noise and model uncertainties. Thus, apart from control challenges, a classical Multi Input Multi Output (MIMO) lead-lag controller is used to construct rebalance loop. In the following, an observer is applied to a Dynamical Tuned Gyroscope (DTG) for the purpose of tilt angel estimation in the presence of extreme uncertainties and output noise. Due to the weak operating performance of linear observers, a sliding mode observer being as nonlinear observer is chosen. Second Order Sliding Mode (SOSM) observer based on super-twisting algorithm is selected as nonlinear observer. The simulation results are presented in two parts: assumption of the model uncertainties and presence of the noise. To conclude, simulations show the adequate performance and robustness of the applied nonlinear observer to the nonlinear model.

کلمات کلیدی:

Dynamical Tuned Gyroscope (DTG), sliding mode observer, super-twisting algorithm, navigation sensors :

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