

Implementing the State Space Approach for Controlling a Suspension System in KAGRA

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Measuring the transfer function is a good way to know the feature of the suspension in frequency space. However, when we start the observation, we cannot use the real suspension in KAGRA. So it is significant to build a model in state space. In state space, one can use ABCD matrices which includes the information of suspensions. And from this, one can simulate the transfer function and frequency response without using real one. To know the time series of suspension, A. Shoda, Y. Fuji and I implemented the state space to control the suspension. To build the model, we used Matlab and Mathematica.

To check the behavior of time series, I checked the Yaw motion of SR3 intermediate mass (IM) because the Yaw has less coupling and it was expected to act better than other degree of freedoms. The SR3 IM Yaw time series of the step response matched for the first 20 seconds.

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