

Vibration Isolation of a Full Electron Beam Projection Lithography System

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Abstract

This paper applies disturbance response decoupling (DRD) techniques 錯誤! 找不到參照來源。 to the vibration control of a full electron beam lithography (EBL) system. In the previous studies [2], we demonstrated the effectiveness of DRD structures in suppressing system vibrations of a quarter EBL system. From the simulation and experimental results, the designed active robust controllers [3] can successfully reduce system responses to machine vibrations while the ground vibrations were controlled by passive elements. This paper extends these ideas to a full EBL system with seven degree of freedom (DOF). The work was carried out in four phases. First, passive isolators were used to reduce the floor disturbance, and active actuators were implemented to reduce machine vibration through DRD design.. Second, the full EBL system was decoupled into corresponding half- and quarter- sub-systems, using symmetric transformation. Third, independent controller design was conducted in the bound, pitch, roll and warp modes, using the techniques developed in [2]. Finally, the system was integrated to verify the overall performance.