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ADAPTIVE VIBRATION CONTROL FOR SERVO SYSTEMS IN DATA STORAGE DEVICES

ABSTRACT

Methods and systems for detecting and correcting for undesirable vibrations impacting the servo systems in data storage devices (10, 2010) are disclosed. A detection technique is provided wherein a detection filter is configured (1010, 1020) to scan (1030) a position signal of the servo system (10, 2010) across a range of frequencies, and, at each respective scanned frequency, record an amplitude associated therewith (1040). The recorded amplitudes are examined (1050) to determine whether any exceed a threshold, thereby locating a peak frequency of the vibration. Using the detected peak frequency of the vibration, a corrective filter is configured (1060) to operate about the peak frequency of vibration. Optimum detection and correction filter structures are disclosed, as are techniques for addressing filter state vectors as initial conditions as the corrective filters are repeatedly engaged during successive settle-out and track follow cycles (between seeks), as are continuous adaptation techniques for changing vibration environments.

FIG. 3