고주파 영역에서의 MR유체 특성연구

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Material Charcterization of MR Fluids at High Frequencies

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Key Words : MR fluids, complex shear modulus, high frequency material charcteristics

Abstract : MR(Magnetorheogical) fluid composed of fine iron powders dispersed in silicon oil is utilized to many smart structures and devices because of its significant rheological property change by the application of an external magnetic field. When we deal with the shock wave attenuation of warship structures, we should be able to characterize the high frequency behavior of MR fluids. So far, however, much efforts have been focused on the material characterization of MR fluids at low frequencies below 100Hz. In this paper, to find complex modulus of MR fluid upon the influence of a magnetic field at high frequency range, we made an experimental setup based on wave transmission technique. A pulse wave propagates through a MR fluid chamber and magnetic coil is used to apply a magnetic field in the MR fluid chamber. Details of the experiment are addressed and the obtained storage and loss moduli are addressed at 50kHz~100kHz.

압전 션트를 이용한 패널의 다중 모드 소음 저감에 관한 연구

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Multi-mode noise reduction of using piezoelectric shunt damping smart panels

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Key Words : Smart panels, Piezoelectric shunt damping, Electrical impedance

Abstract : In this paper, the transmitted noise reduction of smart panels of which passive piezoelectric shunt damping is used, is experimentally studied. Shunt damping experiments are based on the measured electrical impedance model. A passive shunt circuit composed of inductor, and load resistor is devised to dissipate the maximum energy into the joule heat energy. For multi mode shunt damping, the shunt circuit is redesigned by adding a blocking circuit. Also the optimal location of the piezoelectric patch is studied by FEM in order to cause the maximum admittance from the patch for each mode of aluminum plate.
In results, the transmitted sound pressure level of panels is efficiently reduced for multi mode.