Faculty of Electrical Engineering & Computer Science
Master Degree Course Electronics Engineering, MSc EE

HSB
Hochschule Bremen
City University of Applied Sciences

Master 2021

Ms. Sonali Rana

Analyse and Design of Real-Time Secondary Path Estimation in Active Noise Control.

ABSTRACT - Masterthesis

Applying active noise control methods on the non-stationary systems are challenging and requires the online secondary path estimation for active noise control (ANC) systems to deal with the problem of time-varying nature of the secondary path which is required to avoid instabilities. With the expansion of industries, electrical appliances, and other technologies, the issue of acoustic noise has become more prominent. The use of an adaptive algorithms in an ANC system is a useful and effective strategy. For this purpose, the undesired noise is controlled by generating an anti-noise and the residual noise or error signal is sensed by the error microphone. The control filter is adapted by using the same error signal as used in the adaptation of the secondary path modeling filter. Since the transfer function of the path from the control speaker to the error microphone is unknown and continuously changing in time, it is desirable to perform continuous online modeling of this secondary path. In most of the ANC systems, the secondary path estimation is per- formed offline, however, online secondary path estimation is a viable solution. The online secondary path estimation methods along with the active noise control systems are assumed to cancel the electric or engine noise, whose energy is concentrated as narrow-band in low-frequency range under 600 Hz. This method is efficient as it provides a continuous online modelling and with a reasonably low effect on the final value of the error signal. The performance of the overall ANC system is measured in terms of overall reduction of noise (dB) and convergence speed.