

# Measurement of Auditory Alley in Virtual Environment and Its Mathematical Model

Michiko Ohkura\*, Yasuyuki Yanagida\*\*, Taro Maeda\*\*, & Susumu Tachi\*\*

\*Shibaura Institute of Technology, ohkura@sic.shibaura-it.ac.jp

\*\*The University of Tokyo, {yanagida, maeda, tachi}@star.t.u-tokyo.ac.jp

In space perception, the straight lines running phenomenally parallel to the median plane and straight lines running phenomenally equi-distance from the median plane are called parallel alley and equi-distance alley, respectively. It is known that these lines are concave bending towards the median plane in binocular visual space. Using virtual environmental display system, it became possible to construct the experimental system to measure the parallel alley and equi-distance alley in binaural auditory space. The experiments were conducted and the results were obtained as follows:

- (1) Parallel alley and equi-distance alley in auditory space are not always straight in physical sense, and the forms of them depend on the distance from the subjects.
- (2) Parallel alley lies inside equi-distance alley.

Employing sound intensity and binaural time differences as parameters, mathematical models were constructed to explain the auditory alleys. By simulation, the models successfully explained the experimental results obtained in virtual environmental system.

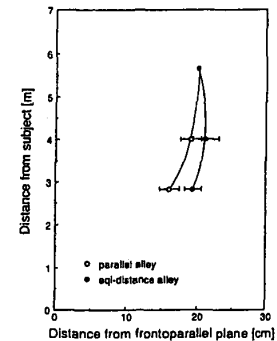


Fig. 1 Experimental Results