

METHOD AND APPARATUS FOR SIMULATING A SOUND IN VIRTUAL SPACE TO
HAVE A LISTENER ENJOY ARTIFICIAL EXPERIENCE OF THE SOUND

ABSTRACT OF THE DISCLOSURE

Sound simulation of the present invention enables a
5 listener in a real space to enjoy a sound of an arbitrarily set
virtual space as if he were in the virtual space. In the
simulation, a transient signal generated in a sound source located
in an arbitrary position in the virtual space is propagated in a
wave motion mode in the virtual space, so that a transient
10 response signal affecting a predetermined observation point is
determined as follows.

In the simulation: the transient signal is represented by
a plurality of sound ray vectors radiating in all directions from
the sound source in the virtual space; a potential is determined
15 with respect to each of the plurality of sound ray vectors each
time each of the sound ray vectors is reflected from a portion of
boundaries and further advances, the potential reaching the
observation point from the portion of the boundaries defining the
virtual space; and, the transient response signal is determined by
20 summing up the potential on a delay time base. Further, in the
simulation: the observation point in the virtual space is
superimposed over a listening point in the real space; a potential
is determined, the potential affecting the observation point after
the elapse of a delay time corresponding to a transient signal



which is generated at a sound source in said virtual space and propagated therein; the potential looking toward said observation point is divided into a plurality of pieces allocated to the individual loud speakers disposed in the real space; and, a
5 transient response signal for each of the loud speakers is determined by adding the pieces of the potential so as to correspond to the delay time.

(See Fig. 5)

