



Guest editorial

Time-domain modelling in outdoor sound propagation

Due to the strong increase in computing power over the last decade, time-domain modelling in outdoor sound propagation applications became possible, and has gained a lot of interest. Since most time-domain models are more or less a direct translation of the basic fluid flow equations, they have a lot of potential. These types of models are often called by their numerical discretisation scheme (finite-difference time-domain models, FDTD) or by the equations that are solved (linearised Eulerian models, linearised fluid dynamics models, or inhomogeneous moving medium sound propagation models). The main advantage upon classical frequency-domain techniques in outdoor sound propagation is the possibility to include the interaction between sound waves and a moving, inhomogeneous atmosphere in complex situations.

This special issue gives an overview of some aspects in ongoing research. In a first paper, the transmission line matrix method is proposed as an alternative to the FDTD method, in order to decrease computational effort. In a second paper, the important issue of wave interaction with grounds encountered in the outdoor environment is addressed. In a next paper, the importance of the numerical discretisation of the moving medium sound propagation equations is studied, as regards stability, accuracy, and computational efficiency. In a last paper, time-domain modelling is applied to sound propagation in urban situations in a three-dimensional simulation space, and allows investigating in detail the effect of the wind flow.

I would like to thank the authors contributing to this special issue for their high-quality papers. My gratitude also goes to the reviewers for providing their expert comments.

Timothy Van Renterghem
*Department of Information Technology,
Ghent University, Sint-Pietersnieuwstraat 41,
9000 Gent, Belgium*
E-mail address: Timothy.Van.Renterghem@intec.Ugent.be

Available online 23 November 2005