

**ACOUSTICS2008/3258**  
**Fricative synthesis investigations using the transmission line  
matrix method**

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We investigate the potential of properly applying the Transmission Line Matrix method to simulate the 3D acoustic field in the vocal tract especially for the synthesis of fricatives. For fricatives, we are mainly interested in the higher end of the spectrum where the planar wave propagation assumption that is accepted in the one-dimensional simulation cannot provide accurate results. This is the main reason why we explore 3D acoustic field simulation. Proper incorporation of noise sources is considered to account for frication. Their placement and acoustic properties are investigated. Motivated by measurements of the airflow during fricative production, we also explore the influence of mean flow to acoustics in the tract. Sound propagation in moving medium is considered for this purpose. The applied vocal tract geometry is determined from 3D MRI images. We present computational considerations for the analyzed framework in parallel to potential benefits compared to the one-dimensional vocal tract simulation.