

ACOUSTICS2008/2815 Cymbal Synthesis

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Time domain sound synthesis based on a physical model of the cymbal presents special problems, due to the need for a strongly nonlinear model of shell vibration. When standard numerical methods such as finite difference schemes are employed, various computational issues arise; among these are numerical stability, a proper treatment of numerical boundary conditions, which are nontrivial at the free edge and center of the the cymbal, and the extra concern of working in polar coordinates. Coupling with mallet and bow models, possibilities for increased computational efficiency using spectral methods, and general strengths and weaknesses of difference methods in this context will be discussed.