Continued Fraction Formulation for Infinite Acoustic Fluid with Uniform Cross Section

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Based on the continued fraction formulation of the scaled boundary finite element method (SBFEM), a continued formulation for infinite acoustic fluid with uniform cross section was proposed. The high-frequency and doubly asymptotic continued fraction formulations were derived. Computational efficiency was compared between the proposed continued formulation and the dynamic mass matrix, which were used to model infinite acoustic fluid with uniform cross section. It was found that the former was higher than the latter. A transient response of infinite acoustic fluid with uniform cross section under upstream excitation was analyzed through using the proposed formulation. Numerical results showed that the stability and convergence of the high-frequency continued fraction formulation need further improving, while the stability and convergence of the doubly asymptotic continued formulation is better, which can model accurately infinite acoustic fluid with uniform cross section.

Keywords: SBFEM, Continued fraction formulation, Infinite acoustic fluid, Transient analysis