



UNIFORMLY ASYMPTOTIC SOLUTIONS FOR PSEUDODIFFERENTIAL EQUATIONS WITH SINGULAR INTEGRAL OPERATORS*

A. HANYGA

*Institute of Solid Earth Physics, University of Bergen,
Allégaten 41, N-5007 Bergen, Norway
andrzej@ifjf.uib.no*

M. SEREDYŃSKA

*Institute of Fundamental Technological Research, Polish Academy of Sciences,
00 049 Warszawa, ul. Świątokrzyska 21, Poland
msered@ippt.gov.pl*

Received 18 June 1999

Revised 28 May 2000

Uniformly asymptotic frequency-domain solutions for a class of hyperbolic equations with singular convolution operators are derived. Asymptotic solutions for this class of equations involve additional parameters — called attenuation parameters — which control the smoothing of the wavefield at the wavefront. At caustics the ray amplitudes have a singularity associated with vanishing of ray spreading and with divergence of an integral controlling the rate of exponential amplitude decay. Both problems are resolved by applying a generalized Kravtsov–Ludwig formula derived in this paper. A different asymptotic solution is constructed in the case of separation of dispersion and focusing effects.

*Presented at ICTCA'99, the 4th International Conference on Theoretical and Computational Acoustics, May 1999, Trieste, Italy.