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Acoustical waves propagation in rough walls street

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We present a method for the numerical calculation of a sound wave propagating in a two dimensional rough-sided street. In this situation, the wave is subject to multiple scattering at the two boundaries. The propagation is governed by a parabolic equation. We show that the amplitude of a pulse may be expressed as the fractional Fourier transform of the incident pulse, and that the order of the transformation is related to the distance between the source and the point of observation. Numerical simulations are proposed as illustration of this model and are compared to experimental results.