Gérard, Patrick; **Lebeau, Gilles**
Diffraction of a wave at a corner. (Diffusion d'une onde par un coin.) (French) Zbl 0779.35063
J. Am. Math. Soc. 6, No. 2, 341-424 (1993).

The authors consider the boundary-value problem given by

$$(\partial_t^2 - \Delta)u = 0, \qquad u|_{\partial\Omega} = 0, \qquad u|_{t<0} = u_i|_{t<0},$$

where $u_i \equiv u_i(t,x,y) \in H'_{\mathrm{loc}}(\mathbb{R}\times\mathbb{R}^2)$ is a certain given function satisfying $(\partial_t^2 - \Delta)u_i = 0$ and $\Omega \subset \mathbb{R}\times\mathbb{R}^2$ is an open domain defined by $\Omega = \mathbb{R}\times(\mathbb{R}^2 \setminus F)$ with $F = \{(x,y) \in \mathbb{R}^2,\ x \geq 0,\ b(x) \leq y \leq a(x)\}$, and study the singularities of the solution for $t > 0$. Here $a(x) \in C^\infty$ and $b(x) \in C^\infty$ are two given functions, analytic near the origin, such that $a(x) > 0 > b(x)$ when $x > 0$ while $a(0) = b(0) = 0$ and $a'(0) > 0 > b'(0)$. This problem corresponds to the diffraction of a cylindrical wave (namely: u_1) by the curved wedge $W = \{(x,y,z) \mid z \in (-\infty,\infty),\ (x,y) \in F\}$.

The paper is rather long and includes three theorems, eleven propositions and eighteen lemmas. It is worthwile to notice that the title of the paper is misleading in physical point of view because the diffraction does not occur here at a cone tip but rather at an edge.

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MSC:

35L05	Wave equation	Cited in **5** Reviews
35S15	Boundary value problems for PDEs with pseudodifferential operators	Cited in **12** Documents
35A20	Analyticity in context of PDEs	
78A45	Diffraction, scattering	

Keywords:

boundary-value problem; singularities; diffraction of a cylindrical wave; curved wedge

Full Text: DOI