TOKYO J. MATH.
VOL. 14, NO. 1, 1991

Energy Inequalities for a Mixed Problem for the Wave Equation in a Domain with a Corner

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(Communicated by T. Kori)

Introduction.

Several studies have already been conducted on the mixed problems for hyperbolic equations in domains with corners. K. Asano [1] considered the mixed problem for the wave equation

$$
(0.1)\qquad \begin{cases} L[u]=\dfrac{\partial^2 u}{\partial t^2}-\dfrac{\partial^2 u}{\partial x^2}-\dfrac{\partial^2 u}{\partial y^2}=f(t,x,y) \\ u(0,x,y)=u_0(x,y)\,, \qquad \dfrac{\partial u}{\partial t}(0,x,y)=u_1(x,y) \\ B_1[u]\,|_{x=0}=\left(\dfrac{\partial u}{\partial x}+b\dfrac{\partial u}{\partial y}-c\dfrac{\partial u}{\partial t}\right)\Big|_{x=0}=0 \\ B_2[u]\,|_{y=0}=\dfrac{\partial u}{\partial y}\Big|_{y=0}=0 \\ (t,x,y)\in(0,T)\times(\boldsymbol{R}^1_+)^2 \end{cases}
$$

where b and c are real constants.

Assuming the following condition for (0.1),

$$
(0.2)\qquad \begin{cases} |b|\leqq c\,, \qquad |b|\leqq 1 \\ (b,c)\neq(-1,1),\,(1,1)\,, \end{cases}
$$

he showed the next result.

THEOREM A (K. Asano). *Let $u\in H_2((0,T)\times(\boldsymbol{R}^1_+)^2)$ be the solution of the problem* (0.1). *Then, there exists a positive constant K independent of u such that the following energy inequality holds: for any t $(0<t<T)$*

Received March 8, 1990