ABSTRACT

THE GENERALIZE AND EXTEND SOBOLEV'S RESULT RELATİVE TO THE WAVE EQUATION WİTH THE FUNCTION VELOCITY

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Initial value problems for hyperbolic equations with function coefficients are considered in this thesis. It was proved that the solutions of these problems satisfy Volterra integral equations with singular kernels. The travel time function $\tau(x, x^0)$ and so-called Sobolev's function $\sigma(x, x^0)$ play very important role in the procedure of this reduction. The travel time function is a solution of the eikonal equation with asymptotic condition $\tau(x, x^0) = O(|(x, x^0)|)$, $x \to x^0$ and Sobolev function is solution of the special transport equation with the asymtotic condition of the form $\sigma(x, x^0) = O\left(\frac{1}{|\lambda - \lambda^0|}\right)$, $x \to x^0$. This transport equation is constructed in the process of the equation. These Volterra integral equations were solved by the successive approximations. The result of the thesis generalize Sobolev's result relative to the wave equation with the function velocity.

Key words : Transport equation , Eikonal equation , Sobolev function , Ray , Volterra