A necessary condition for the well posed hyperbolic mixed problem with variable coefficients

By

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§1. Introduction

In the present article we shall derive a necessary condition (say, Lopatinski's condition) for the well posed mixed problem of the first order hyperbolic systems with variable coefficients. Here we say that the mixed problem is well posed, if this problem has a local solution for any sufficiently smooth deta and a finite propagation speed.

In the case of constant coefficients, R. Hersh in [5] and T. Kasahara in [10] proved the global existence of the solution for the mixed problem of the first order hyperbolic systems under Lopatinski's condition, and Hersh in [6] and [7] researched into the existence and the finite propagation speed of the solution for the higher order hyperbolic systems. Moreover T. Shirota in [14] studied precisely the finite propagation speed of the solution for the single higher order hyperbolic equations. Recently R. Sakamoto in [13] characterized completely the necessary and sufficient conditon for the existence and the finite propagation speed of the solution for the single higher order hyperbolic equations.

In the case of variable coefficients, M. Ikawa proved in [3] that the mixed problem for the wave equation with an oblique derivative boundary condition is well posed. J. Chazarain in [2] and R. Beals in [1] proved the existence of the solution in Gevrey-class for the