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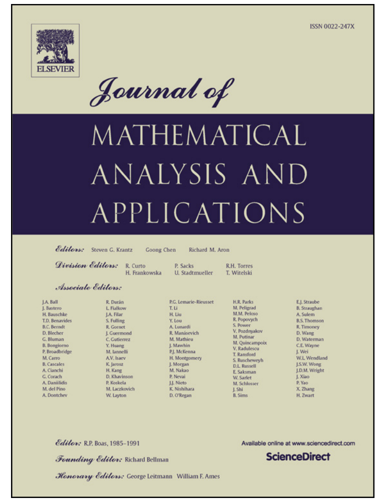

The supersonic flow past a wedge with large curved boundary

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THE SUPERSONIC FLOW PAST A WEDGE WITH LARGE CURVED BOUNDARY

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ABSTRACT. In this paper, we construct a piecewise smooth solution for a 2-D supersonic potential flow past a curved wedge, whose boundary is assumed to have large variation. In fact, we originally provide a background solution, which is constructed by assuming the coming flow has limit speed. Its shock coincides with the curved wedge and the flow behind the shock is defined only along the wedge. Then our problem can be treated as a perturbation of this background solution and the solution is obtained by showing certain estimates.

CONTENTS

1. INTRODUCTION

In this paper, we employ the following 2-dimensional steady irrotational Euler system to describe the flow fields

$$\begin{cases}(\rho u)_x + (\rho v)_y = 0, \\ v_x - u_y = 0,\end{cases} \tag{1.1}$$

where (u, v) denotes the velocity field, ρ the density, $p = A\rho^\gamma$ the pressure. Since (1.1) is a conservation law, for a piecewise smooth solution, it holds the Rankine-Hugoniot condition

$$\begin{cases}[\rho u]\phi' = [\rho v], \\ [v]\phi' = -[u],\end{cases} \tag{1.2}$$

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