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流函数法在铸轧变形理论分析中的应用

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摘 要: 根据流体力学中的Navier-Stokes方程, 利用流函数法, 对铸轧变形区的流变特性进行了理论分析。铸轧板的宽长比较大, 可简化为平面问题, 由此建立的二阶偏微分方程组, 直接求解仍较困难; 引入流函数, 设定并建立铸轧区的速度场, 使其满足不可压缩条件和速度边界条件, 这样求解偏微分方程组成为可能, 并由此可求出板带铸轧变形区的单位压力分布解析式创造条件。

关键字: 流函数 板带铸轧 变形区

THEORETICAL ANALYSIS OF FLOW FUNCTION

METHOD IN CASTING ROLLING DEFORMATION

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Abstract: According to the Navier-Stokes equation in fluid mechanics, the rheological properties of casting-rolling deformation area with flow function method was analyzed. The researching problem was simplified into a 2D one, because the width of casting-rolling sheet was much greater than height. It was found that direct solution for the established two-dimensional partial differential equation is difficult, however if flow function is led in and velocity field of casting-rolling area is established, which satisfies not only the condition of no-compression but also velocity boundary, then it is possible to find out

the solution of partial differential equation and the analytic solution of average unit compression stress distribution for casting-rolling deformed area.

Key words: flow function strip casting-rolling mill deformation area

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