

Solutions to quasilinear equations by an iterative method

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Abstract

We apply an iterative method in order to construct a solution to the mean curvature equation for nonparametric surfaces.

1 Introduction

The prescribed mean curvature equation with Dirichlet condition for a nonparametric surface $X : \bar{\Omega} \rightarrow \mathbb{R}^3$, $U(x, y) = (x, y, u(x, y))$ is the quasilinear partial differential equation

$$(1) \begin{cases} (1 + u_y^2)u_{xx} + (1 + u_x^2)u_{yy} - 2u_x u_y u_{xy} = 2h(u) (1 + |\nabla u|^2)^{\frac{3}{2}} & \text{in } \Omega \\ u = g & \text{in } \partial\Omega \end{cases}$$

where Ω is a bounded domain in \mathbb{R}^2 , and $h : \mathbb{R} \rightarrow \mathbb{R}$ is a given continuous function. This problem and the general parametric case have been studied by several authors, see e.g. [2-5,6,7,9-13].

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