Płociniczak, Łukasz; **Okrasiński, Wojciech**; **Nieto, Juan J.**; **Domínguez, Oscar**
On a nonlinear boundary value problem modeling corneal shape. (English) Zbl 1307.92129
J. Math. Anal. Appl. 414, No. 1, 461-471 (2014).

Summary: We present some results concerning a boundary value problem for a nonlinear ordinary differential equation that was used before in modeling the topography of human cornea. These results generalize previously obtained theorems on existence and uniqueness. We show that our equation has a unique solution for all parameters and conditions that can arise in physical situation. In the second part of the article we derive some new estimates and approximate solutions. Numerical calculations verify that these approximations are very accurate.

MSC:

92C50 Medical applications (general)
34A12 Initial value problems, existence, uniqueness, continuous dependence and continuation of solutions to ordinary differential equations
34D10 Perturbations of ordinary differential equations

Keywords:

boundary-value problem; corneal topography; estimates

Full Text: DOI

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