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Lower and Upper Solutions and Prescribed Curvature Problems

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Abstract

The method of lower and upper solutions for the study of second order nonlinear differential equations depends upon the maximum principle, and all aspects of both topics have been nicely and extensively developed by Alberto Canada and his school, with a particular emphasis upon sign properties of the corresponding Green functions.

In this lecture, we present some applications of upper and lower solutions to some boundary value problems involving $\phi(t,\cdot)$-Laplacians, in cases where the estimates on the derivative of the solutions follow from the existence of bounding functions.

The results are used to generalize recent existence conditions for boundary value problems involving curvature-like operators.

References

[1] J. Mawhin, Lower and upper solutions for quasilinear second order ordinary differential equations and problems with prescribed curvature, to appear

[2] M.H. Pei, M.Y. Liu, Existence and uniqueness of periodic solutions for prescribed mean curvature equations without growth restrictions *Contemp. Math.*, **28** (4) (2026) 2550049.

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