

EXISTENCE AND INCLUSION METHODS FOR NONLINEAR ELLIPTIC BOUNDARY VALUE PROBLEMS ON UNBOUNDED DOMAINS

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Computer-assisted existence and inclusion methods for nonlinear elliptic boundary value problems of the type

$$-\Delta u(x) + f(x, u(x)) = 0 \quad \text{in } \Omega, \quad B[u](x) = s(x) \quad \text{on } \partial\Omega$$

with some given nonlinearity f yield good results when the spectrum of the linearisation of the left-hand side at some approximate solution is well bounded away from zero.

Here we will focus on unbounded domains where an additional difficulty consists in the possible presence of essential spectrum.

In the case of the Emden's equation, where $f(x, u) = -u^2$, we will present an existence and inclusion result when the domain is an infinite strip and discuss generalisations to more general domains.