

# Infinite semipositone problems with a falling zero and nonlinear boundary conditions

Mohan Kumar Mallick\*

## Abstract

We consider the boundary value problem

$$\begin{cases} -u'' = h(t)\left(\frac{au - u^2 - c}{u^\alpha}\right), & t \in (0, 1), \\ u(0) = 0, u'(1) + g(u(1)) = 0, \end{cases}$$

where  $a > 0, c \geq 0, \alpha \in (0, 1), h : (0, 1] \rightarrow (0, \infty)$  is a continuous function which is allowed to be singular at  $t = 0$ , but belongs to  $L^1(0, 1) \cap C^1(0, 1)$ , and  $g : [0, \infty) \rightarrow [0, \infty)$  is a continuous function. We discuss existence, uniqueness, and non existence results for positive solutions for certain ranges of  $a$  and  $c$ .

This is a joint work with R. Shivaji (University of North Carolina at Greensboro, USA), S Sundar (IIT Madras, India), L Sankar (IIT Palakkad, India).

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\*Department of Mathematics, IIT Madras, Chennai-600036, India, e-mail: mohan.math09@gmail.com