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Computation of topological degree of unilaterally asymptotically linear operators and its applications. (English) [Zbl 1191.47076](#)

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Suppose that E is a Banach space, P a cone in E , and let $w \in E$. A nonlinear operator $A : E \rightarrow E$ is said to be unilaterally asymptotically linear along $w + P$ if there is a bounded linear operator L in E such that

$$\lim_{\|x\| \rightarrow \infty, x \geq w} \frac{\|Ax - Lx\|}{\|x\|} = 0.$$

A is said to be a cone mapping if $A(P) \subseteq P$.

The authors present several theorems on the computation of the topological degree and of fixed point indices for unilaterally asymptotically linear operators that are not cone mappings. These theorems are applied to a class of semilinear elliptic boundary value problems with asymptotically linear nonlinearity. Under a variety of conditions, the existence of one or three solutions is proved, including an existence result for a sign changing solution.

Reviewer: [Nils Ackermann \(México\)](#)

MSC:

- [47H11](#) Degree theory for nonlinear operators
- [35J61](#) Semilinear elliptic equations
- [35J25](#) Boundary value problems for second-order elliptic equations
- [47N20](#) Applications of operator theory to differential and integral equations

Cited in **2** Reviews
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Keywords:

asymptotically linear operator; topological degree; vector lattice; elliptic boundary value problem

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