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**Title:** On the eigenvalues of a perturbed Fredholm operator of index zero

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**Abstract:** Let  $H$  be a real Hilbert space and denote by  $S$  its unit sphere. Consider the nonlinear eigenvalue problem  $Lx + \varepsilon N(x) = \lambda x$ , where  $\varepsilon, \lambda \in \mathbb{R}$ ,  $L : H \rightarrow H$  is a bounded self-adjoint linear operator with nontrivial kernel and closed image, and  $N : H \rightarrow H$  is a (possibly) nonlinear perturbation term. A unit eigenvector  $\bar{x} \in S \cap \text{Ker}L$  of  $L$ , corresponding to the eigenvalue  $\lambda = 0$ , is said to be *persistent* if it is close to solutions  $x \in S$  of the above equation for small values of the parameters  $\varepsilon \neq 0$  and  $\lambda$ . We give an affirmative answer to a conjecture formulated by R. Chiappinelli, M. Furi and M.P. Pera. Namely, we prove that if  $N$  is Lipschitz continuous and the eigenvalue  $\lambda = 0$  has odd multiplicity, then the sphere  $S \cap \text{Ker}L$  contains at least one persistent eigenvector. This is a joint work with A. Calamai, M. Furi and M.P. Pera.