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On the shape of solutions of an asymptotically linear problem

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Abstract. In this paper we study the problem

$$\begin{cases} -\Delta u = |u|^{\epsilon} u & \text{in } \Omega \\ u = 0 & \text{on } \partial\Omega \end{cases} \tag{0.1}$$

where Ω is a smooth bounded domain of $\mathbb{R}^N$, $N \geq 1$, $\epsilon > 0$. We will show that, under some assumptions, the solutions to (0.1) are close to suitable linear combinations of eigenfunctions of the problem

$$\begin{cases} -\Delta u = \lambda u & \text{in } \Omega \\ u = 0 & \text{on } \partial\Omega\,. \end{cases}$$

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