Multiplicity of solutions for a class of singular problems

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Abstract. We use variational methods to establish the existence of two nontrivial solutions for the equation $-\Delta u = (-\frac{1}{u^\beta} + \lambda u^p)\chi_{\{u>0\}}$ in Ω, under Dirichlet boundary conditions, where $0 < \beta < 1$ and $0 < p < 1$. In the first approach we consider a sequence of ε-problems with $1/u^\beta$ replaced by $u^q/(u+\varepsilon)^{q+\beta}$, $0 < q < p$. When the parameter $\lambda > 0$ is sufficiently large, we find two critical points for the corresponding ε-functional which, in the limit as $\varepsilon \to 0$, give rise to two distinct nonnegative solutions of the original problem. Another approach is based on domain perturbations, we then find a unique positive solution for λ large enough. This is talk is a result of a joint work with Prof. Marcelo Montentegro (UNICAMP-Brazil).