

ASYMPTOTIC BEHAVIOUR OF SOLUTIONS FOR A COUPLED ELLIPTIC SYSTEM IN THE PUNCTURED BALL

RAYSSA CAJU

Abstract: Our main goal is to study the asymptotic behavior near an isolated singularity of local solutions for strongly coupled critical elliptic systems of the form

$$(1) \quad -\Delta_g u_i + \sum_{j=1}^2 A_{ij}(x)u_j = \frac{n(n-2)}{4} |\mathcal{U}|^{\frac{4}{n-2}} u_i$$

which are defined in the punctured unit ball, where g a smooth Riemannian metric on $B_1^n(0)$ and A is a C^1 map from the unit ball to the vector space of symmetrical 2×2 real matrices.

Since from the viewpoint of conformal geometry our systems are pure extensions of Yamabe-type equations in the strongly coupled regime, there has been considerable interest in recent years in proving compactness results for this type of systems. Such type of problems provides a natural background for the interplay between geometry and asymptotic analysis.

We prove a sharp result on the removability of the isolated singularity for all components of the solutions when the dimension is less than or equal to five and minus the potential A of the operator is cooperative.