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Fully nonlinear version of the Min-Oo Conjecture

In this talk, we show rigidity results for super-solutions to fully nonlinear elliptic conformally invariant equations in subdomains of the standard n-sphere $\mathbb{S}^n$ under suitable conditions on the boundary.

This proves rigidity for compact connected locally conformally flat manifolds (M, g) with boundary such that the eigenvalues of the Schouten tensor satisfy a fully nonlinear elliptic inequality and whose boundary is isometric to a geodesic sphere $\partial D(r)$, $D(r)$ a geodesic ball of radius $r \in (0, \pi/2]$ in $\mathbb{S}^n$, and totally umbilic with mean curvature bounded bellow by the mean curvature of this geodesic sphere. Under the above conditions, (M, g) must be isometric to the closed geodesic ball $\overline{D(r)}$. In particular, we recover the solution by F.M. Spiegel to the Min-Oo conjecture for locally conformally flat manifolds.

As a side product, our methods in dimension 2 provide a new proof to a classical theorem of Toponogov. Roughly speaking, Toponogov's Theorem is equivalent to a rigidity theorem for spherical caps in the Hyperbolic three-space $\mathbb{H}^3$.

This is a joint work with E. Barbosa and M.P. Cavalcante.