

Group-invariant solutions for the Ricci curvature equation and the Einstein equation

João Paulo dos Santos¹, Romildo Pina²

¹ Universidade de Brasília

² Universidade Federal de Goiás

In this talk, it will be considered the following problems:

(P1) Given a symmetric (0,2)-tensor R , defined on a manifold M^n , $n \geq 3$, does there exist a Riemannian metric g , such that $\text{Ric } g = R$?

(P2) Given a symmetric (0,2)-tensor T , defined on a manifold M^n , $n \geq 3$, does there exist a Riemannian metric g , such that $\text{Ric } g - \frac{1}{2}Kg = T$?

Where, in both problems, $\text{Ric } g$ is the Ricci tensor and K is the scalar curvature of g , respectively.

Finding solutions to the problems (P1) and (P2) corresponds to solving systems of nonlinear second-order differential equations. We use the technique of Lie point symmetries to provide conformally flat metrics that solves (P1) and (P2).

References

- [1] PINA, J. L., dos SANTOS, J. P. - *Group-invariant solutions for the Ricci curvature equation and the Einstein equation.*, J. Differential Equations 266 (2019), no. 4, 2214–2231.