



Seminário de Geometria

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Invariant metrics of real flag manifolds

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Abstract Homogeneous spaces are one of the most fruitful sources to provide examples in geometry. For example, for decades, until the late seventies, the only examples of compact manifolds presenting Einstein metrics were homogeneous spaces. A particular rich class of homogeneous spaces is that of the flag manifolds, which are the natural generalization of the projective spaces and Grassmannians. In the case of complex flag manifolds, such as complex projective spaces, the description of all invariant metrics has been known since the work of Siebenthal in 1969 [1]. In the complex case, there is a unique decomposition of the isotropy representation into irreducible submodules and the metrics are obtained by multiplying by positive constants the restrictions of the Cartan metric to the irreducible submodules. In the real case, the situation is much richer, because there can be infinite decompositions of the isotropy representation in irreducible submodules. In this lecture, we will present our result of 2015 together with Prof. Luiz San Martin [2], classifying and describing all the invariant metrics of the flag manifolds of the so-called normal real forms, which include the real projective spaces and real Grassmannians. This description is important because it is through it that it is possible in this context to look for and find interesting examples in geometry, as in [3].

Referências

- [1] J. Siebenthal (1969). Sur certains modules dans une algebre de Lie semi-simple. *Comment. Math. Helv.*, vol. 44, 1-44.
- [2] M. Patrão e L. San Martin (2015). The isotropy representation of a real flag manifold: split real forms. *Indag. Math.*, vol. 26, 547–579.
- [3] A. Freitas, V. del Barco e L. San Martin (2018). Invariant almost complex structures on real flag manifolds. *Annali di Matematica Pura ed Applicata*, vol. 197, 1821–1844.