Seminário
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The Hsiung-Minkowski identities

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Abstract

We prove the classical Hsiung-Minkowski identities: let $f : N \to \mathbb{R}^{n+1}$ be a closed orientable embedded C^1 hypersurface, let X be the position vector field and let H_i denote the ith-mean curvature. Then, for any $0 \le i \le n-1$, we have that

$$\int_N (H_i - \langle X, \vec{n} \rangle H_{i+1}) \operatorname{vol}_N = 0.$$

This is achieved in the ambient of Euclidean space, recurring to a new technique with a new differential system introduced in [1]. We also see how the same type identities are developed for a Riemannian manifold of constant sectional curvature c. Eventually we prove them all together, for $c = -1, 0, 1$.

Keywords: manifold, vector field, tangent bundle, Riemannian metric, hypersurface, integral invariant, Euler characteristic.

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References

[1] R. Albuquerque, A fundamental differential system of Riemannian geometry, to appear in *Revista Matemática Iberoamericana*, Vol 35.6, 2019, arxiv:1112.3213.