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Centro de Investigação em Matemática e Aplicações  
Departamento de Matemática  
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## Seminário

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CLAV – Anfiteatro 1 – 15h

## The Hsiung-Minkowski identities

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### Abstract

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

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

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.