

A note on isometric immersions and differential equations which describe pseudospherical surfaces

Diego Catalano Ferraioli ^{*}
Universidade Federal da Bahia

Tarcísio Castro Silva [†]
Universidade de Brasília

Keti Tenenblat [‡]
Universidade de Brasília

Abstract

In this talk, we will see families of second order non-linear partial differential equations describing pseudospherical surfaces (**pss** equations), with the property of having local isometric immersions in \mathbb{E}^3 , with principal curvatures depending on finite-order jets of solutions of the differential equation. These equations occupy a particularly special place amongst **pss** equations, since a series of recent papers [1, 2, 3, 4, 5], on several classes of **pss** equations, seemed to suggest that only the sine-Gordon equation had the above property. Explicit examples are given, which include the short pulse equation and some generalizations.

References

- [1] T. Castro Silva and N. Kamran, Third order differential equations and local isometric immersions of pseudospherical surfaces, *Communications in Contemporary Math.* **18**, No. 6 (2016) 1650021 (41 pages).
- [2] D. Catalano Ferraioli and L. A. de Oliveira, Local isometric immersions of pseudospherical surfaces described by evolution equations in conservation law form, *J.Math. Anal. Appl.* **446** (2017) 1606–1631.
- [3] N. Kahouadji, N. Kamran and K. Tenenblat, Local isometric immersions of pseudo-spherical surfaces and evolution equations, *Fields Inst. Commun.* **75** (2015) 369–381.
- [4] N. Kahouadji, N. Kamran and K. Tenenblat, Second-order equations and local isometric immersions of pseudo-spherical surfaces. *Comm. Anal. Geom.* **24** (3) (2016) 605–643.
- [5] N. Kahouadji, N. Kamran and K. Tenenblat, Local isometric immersions of pseudo-spherical surfaces and kth-order evolution equations, *Communications in Contemporary Math.* **21**, No. 4 (2019) 1850025 (21 pages).

^{*}e-mail: diego.catalano@ufba.br

[†]e-mail: tarcisio@mat.unb.br

[‡]e-mail: K.Tenenblat@mat.unb.br