respectively. Denote by $\hat{t}_0$ the largest value of t for which the curve Γ has a simple spherical inflection in U_0. Denote by $\hat{t}_1$ the smallest value of t for which the curve Γ has a simple spherical inflection in U_1. We proved that between $\Gamma(\hat{t}_0)$ and $\Gamma(\hat{t}_1)$ there is at least one vertex of Γ of odd order. We can join Γ to γ by a homotopy γ_s such that at each $s \in [0,1)$ the curve γ_s has only simple spherical inflections. Thus each γ_s will have at least one vertex of odd order. This implies that γ will also have at least one vertex of odd order. This proves Proposition 4. $\square$

REFERENCES

[1] ARNOLD, V. I. Wave front evolution and equivariant Morse lemma. *Comm. Pure Appl. Math. 29* (1976), 557–582.

[2] ARNOLD, V. I., A. N. VARCHENKO and S. M. GUSEIN-ZADE. *Singularities of Differentiable Maps*, Vol. 1. Birkhäuser, 1986. (In Russian: Nauka, 1982)

[3] ARNOLD, V. I. *Singularities of Caustics and Wave Fronts.* Kluwer, Maths. and its Appl., Soviet series *62*, 1991.

[4] —— On the number of flattening points of space curves. *Amer. Math. Soc. Trans. Ser. 171* (1995), 11–22.

[5] —— The geometry of spherical curves and the algebra of quaternions. *Russian Math. Surveys 50* (1995), 1–68.

[6] BARNER, M. Über die Mindestanzahl stationärer Schmiegebenen bei geschlossenen strengkonvexen Raumkurven. *Abh. Math. Sem. Univ. Hamburg 20* (1956), 196–215.

[7] BLASCHKE, W. *Vorlesungen über Differentialgeometrie I*, 3rd ed. Springer-Verlag, Berlin, 1930.

[8] DARBOUX, G. *Leçons sur la théorie des surfaces*, Vol. 1, Chap. 1. Gauthier-Villars, Paris, 1887.

[9] FENCHEL, W. Über einen Jacobischen Satz der Kurventheorie. *Tôhoku Math. J. 39* (1934) 95–97.

[10] —— On the differential geometry of closed space curves. *Bull. Amer. Math. Soc. 57* (1951), 44–54.

[11] HEIL, E. A four-vertex theorem for space curves. *Math. Pannon. 10* (1999), 123–132.

[12] IZUMIYA, S., H. KATSUMI and T. YAMASAKI. The rectifying developable and the spherical Darboux image of a space curve. *Banach Center Publ. 50* (1999), 137–149.

[13] ROMERO-FUSTER, C. and E. SANABRIA-CODESAL. Generalized helices, twistings and flattenings of curves in n-space. *Mat. Contemp. 17* (1999), 267–280.

[14] SHCHERBAK, O. P. Projectively dual space curves and Legendre singularities. *Trudy Tbiliss. Univ. 232/233* (1982), 280–336. English transl. in: *Selecta Math. Soviet. 5* (1986), 391–421.

[15] URIBE-VARGAS, R. On the higher-dimensional four-vertex theorem. *C. R. Acad. Sci. Paris Sér. I Math. 321* (1995), 1353–1358.

[16] —— Rigid body motions and Arnold's theory of fronts on $\mathbf{S}^2 \subset \mathbf{R}^3$. *J. Geom. Phys. 45* (2003), 91–104.

[17] —— On vertices and focal curvatures of space curves. To appear.

(Reçu le 16 juin 2003)

Ricardo Uribe-Vargas
Collège de France
11, place Marcelin-Berthelot
F-75005 Paris
France
e-mail: uribe@math.jussieu.fr

Leere Seite
Blank page
Page vide