

**Meeting:** 1006, Lubbock, Texas, SS 6A, Special Session on Real Algebraic Geometry

1006-14-209            **Severine C.M. Fiedler\*** ([severine.fiedler@free.fr](mailto:severine.fiedler@free.fr)), 57 chemin de la Pelude, 31400  
Toulouse, France. *Real pencils of cubics applied to solve an interpolation problem.*

Consider a piece of convex curve  $\mathcal{C}$  and four points on  $\mathcal{C}$ . Find a sufficient condition on the points to grant that there exists a rational cubic  $C_3$  such that a parametrized arc of  $C_3$  is isotopic to  $\mathcal{C}$ , tangent to  $\mathcal{C}$  at its extremities, and interpolates the four points. We found such a condition after studying real pencils of cubics with eight base points lying in convex position in  $\mathbb{R}P^2$ . A generic pencil  $\mathcal{P}$  has twelve singular (nodal) cubics and nine distinct base points; any eight base points determines the ninth one. If  $\mathcal{P}$  is real,  $\mathcal{P}$  has eight *distinguished cubics*, that is real singular cubics with a loop containing some base points. If eight of the base points lie in convex position, one can often deduce the pencil from the following combinatorial data: the list of the conics through five of the points, enriched with the position of each of the remaining three points (inside or outside). (Received February 15, 2005)