Mathematics > Geometric Topology

Counting real cubics with passage/tangency conditions

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We study the following question: given a set of seven points and an immersed curve in the real plane R^2, all in general position, how many real rational nodal plane cubics pass through these points and are tangent to this curve. We count each such cubic with a certain sign, and present an explicit formula for their algebraic number. This number is preserved under small regular homotopies of the curve, but jumps (in a well-controlled way) when in the process of homotopy we pass a certain singular discriminant. We discuss the relation of such enumerative problems with finite type invariants. Our approach is based on maps of configuration spaces and the intersection theory in the spirit of classical algebraic topology.

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