Interpolation between the isoperimetric ratio and curvature for plane curves and an application to curvature flows with non-local terms

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As a well-known fact, the area preserving curvature flow for a plane curve converges to a circle as time tends to infinity provided the initial curve is convex. Similar asymptotics is known for the length-preserving flow and the gradient flow of the isoperimetric ratio under the convexity assumption. It is a quite basic question that how the flow behaves when we do not assume the convexity. To give an answer we provide several interpolation inequalities between the isoperimetric ration and curvature. Using this, we see that even if the initial curve is not necessarily convex, the flow converges to a circle as long as it exists globally in time. This is a joint work with Kohei Nakamura.