Osculatory Interpolation

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We consider the problem of G^2 two-point Hermite interpolation by rational cubics. Given two points with unit tangent vectors and consistent signed curvatures, the necessary and sufficient conditions are placed on the weights of the rational cubic@curve which ensures that (i) if the data (control polygon) suggest a C-shaped curve, the the rational cubic interpolates a C-shaped curve without loops, cusps, or inflections, and (ii) if the data suggest an S-shaped curve, the the rational cubic interpolates an S-shaped curve with a single inflection, no loops and no cusps.