Summary: This paper presents a general nonlinear model predictive control scheme for path following problems. Path following problem of nonlinear systems is transformed into a parameter-dependent regulation problem. Sufficient conditions for recursive feasibility and asymptotic convergence of the given scheme are presented. Furthermore, a polytopic linear differential inclusion-based method of choosing a suitable terminal penalty and the corresponding terminal constraint are proposed. To illustrate the implementation of the nonlinear model predictive control scheme, the path following problem of a car-like mobile robot is discussed, and the control performance is confirmed by simulation results.

Keywords: model predictive control; nonlinear systems; path following; feasibility and convergence
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