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Bad reduction of post-critically finite rational functions

Elliptic curves with complex multiplication (CM) have everywhere (potentially) good reduction. In the study of the arithmetic of dynamical systems, post-critically finite (PCF) rational functions, those whose critical points all have finite forward orbit, are seen as something of an analogue of CM elliptic curves, and so one might ask if they have similar good reduction properties. More concretely, it is easy to show that PCF polynomials have potential good reduction except above a finite set of primes depending on the degree, and it is natural to ask if a similar property extends to PCF rational functions (indeed, such extensions have been asserted in the field). We produce infinite families of rational functions in every degree which demonstrate that no such generalization can be true.