

Correction to “Newton’s method and a class of meromorphic functions without wandering domains”

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At the beginning of Section 3 it was noted that for functions in N which are neither entire nor rational, the backward orbit $O^-(\infty)$ is infinite. The argument that was given for this is incorrect. A (hopefully) correct argument is as follows:

Let $f \in N$ be transcendental with a pole p . Suppose that f takes the value p only finitely many times. Properties (i) and (iv) imply that then f has the form

$$f(z) = p + R(z)e^{Q(z)}$$

with a rational function R and a polynomial Q . It follows that

$$f'(z) = (R'(z) + R(z)Q'(z))e^{Q(z)}.$$

Hence f' has only finitely many zeros. Property (iii) now yields that f has only finitely many fixed points. Thus

$$h(z) := \frac{f(z) - z}{p - z}$$

has only finitely many zeros and poles. Moreover, h has only finitely many 1-points. The Great Picard Theorem implies that h is rational. Hence f is rational, contradicting our assumption. Thus $f^{-1}(p)$ is infinite. Hence $f^{-2}(\infty)$ is infinite. In particular, $O^-(\infty)$ is infinite.

I thank Mareike Wolff for drawing my attention to this error.