On the connectivity of the Julia set for meromorphic entire maps

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In this work we complete the proof of the following theorem: If f is a meromorphic map with a disconnected Julia set then f has at least one weakly repelling fixed point (that is either repelling or parabolic with derivative exactly one). A nice corollary of this result is that the Newton's method applied to an entire map has connected Julia set.

The proof is partially based on the solution of an old question about the existence of absorbing domains. Let U be a hyperbolic domain in $\mathbb{C}$ and let $f : U \to U$ be a holomorphic map. An invariant domain $W \subset U$ is *absorbing in U for f* if for every compact set $K \subset U$ there exists $n = n(K) > 0$, such that $f^n(K) \subset W$.