ADDITIONAL PROBLEMS

1. Assume that $f \in C^4(R)$, and $f'(0) \neq 0$. Show that there is a unique Möbius transform $\phi(x) = \frac{ax+b}{cx+d}$, such that

$$\lim_{x \to 0} \frac{\phi \circ f(x) - x}{x^3}$$

is finite. When the limit is finite, show that it equals to $\frac{Sf(0)}{6}$.

2. Assume that $Sf(x) < 0$ for all $x \in R$, p is a one-sided attracting periodic point of f, and $W(p)$ is the maximal stable interval containing p. Assume that $W(p)$ is bounded. Show that for some i, there is a critical point of f in $W(f^i(p))$.

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