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Two New Criteria for Normal Families

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Abstract. Let a_0, \dots, a_{k-1} be analytic functions on a domain Ω . Let \mathcal{F} be a family of meromorphic functions f defined on Ω such that $f \neq 0$ and $f^{(k)} + a_{k-1}f^{(k-1)} + \dots + a_0f \neq 0$ on Ω , for all $f \in \mathcal{F}$. Then $\{f'/f : f \in \mathcal{F}\}$ is a normal family. Furthermore, let a_0, \dots, a_{k-1} be meromorphic functions on a domain Ω . Let \mathcal{F} be a family of meromorphic functions f on Ω such that $f \neq 0$, $f' \neq 0$ and $f^{(k)} + a_{k-1}f^{(k-1)} + \dots + a_0f \neq 0$ on Ω , for all $f \in \mathcal{F}$. Then $\{f'/f : f \in \mathcal{F}\}$ is a normal family. These two new criteria for normal families extend a recent result of Bergweiler and Langley, [1, Corollary 1.1].

Keywords. Normal families, meromorphic functions, Nevanlinna theory.

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- 1 W. Bergweiler and J. K. Langley, Nonvanishing derivatives and normal families, *J. Anal. Math.* **91** (2003), 353–367.