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The Origins of the Mittag-Leffler Theorem

The Swedish mathematician Gösta Mittag-Leffler (1846–1927) studied as a “post-doctoral” student in Paris with C. Hermite and in Berlin with K. Weierstrass between the years of 1873 and 1876, when Weierstrass published his influential *Zur Theorie der eindeutigen analytischen Funktionen*. During this period of time, Mittag-Leffler elaborated upon this work of Weierstrass’ and proved the now-familiar theorem (in present-day notation) associated with his name:

Suppose Ω is an open set in the plane, $A \subset \Omega$, A has no limit point in Ω , and to each $\alpha \in A$ there are associated a positive integer $m(\alpha)$ and a rational function

$$P_\alpha(z) = \sum_{j=1}^{m(\alpha)} c_{j,\alpha}(z - \alpha)^{-j}.$$

Then there exists a meromorphic function $f \in \Omega$, whose principal part at each $\alpha \in A$ is P_α and which has no other poles in Ω . In this paper I will briefly present a background to the *Mittag-Leffler Theorem*, including the work of Weierstrass regarding entire functions. I will then discuss Mittag-Leffler’s extension of these results to the existence of a meromorphic function with arbitrarily assigned principal parts. Finally, I will investigate Hermite’s reception of Mittag-Leffler’s theorem through their correspondence (of which Hermite’s letters have survived) and his addition of the Mittag-Leffler theorem to his lecture material.