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**Schwarz-Christoffel Mapping  
of Bounded, Multiply Connected Domains**

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**Abstract.** A Schwarz-Christoffel formula for conformal maps from the exterior of a finite number of disks to the exterior of polygonal curves was derived by DeLillo, Elcrat, and Pfaltzgraff in [9] using the Reflection Principle. The derivative of the map is expressed as an infinite product. In this paper, the formula for the map from bounded circular domains to bounded polygonal domains is derived by the same method. Convergence of the resulting infinite product is proved for sufficiently well-separated domains. A formula for the bounded case was also derived by Crowdy in [5] using Schottky-Klein prime functions. We show that Crowdy's formula can be reduced to ours. In addition, we discuss the relation of these formulae to the Poincaré theta series for functions automorphic under the Schottky group of Moebius transformations generated by reflections in circles. We also derive a formula for the map to circular slit domains.

**Keywords.** Schwarz-Christoffel transformation, conformal mapping, multiply connected domains, Schottky group, Schottky-Klein prime functions, Poincaré theta series.

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