# Alternative Forms of Green's Functions and Infinite Product Representation of Elementary Functions

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## Summary

A novel technique, recently reported by the author for the first time, is employed here for obtaining nontrivial infinite product representations for a number of elementary functions. The technique is reviewed to take a look at some of its peculiarities. The technique is based on the comparison of alternative expressions of Green's functions for the two-dimensional Laplace equation. Those expressions are constructed by different methods. Some standard boundary-value problems are considered for the indicated equation. Classical closed analytical forms of Green's functions for such problems are compared against those obtained by the method of images. This comparison brings a number of never before reported infinite product representations for some trigonometric and hyperbolic functions. To broaden limited frontiers of the successful implementation of the method of images, we arrived at expressions of Green's functions in terms of infinite products. What makes such expressions of Green's functions really valuable is that they are used for the derivation of some interesting infinite product-containing identities. This maintains a basis for obtaining infinitwe product representations of elementary functions. Computational properties of those representations are analyzed to create a background for use of them in approximation of functions.