

Solving the functional equation

**$f(z) + f(2z) + \cdots + f(nz) = 0$ by a
complex operator**

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In this paper, we use the properties of almost periodic functions to study the distribution of the zeros of the function $1 + 2^z + \cdots + n^z$ very related to the solutions of the functional equation $f(z) + f(2z) + \cdots + f(nz) = 0$. Finally, the application of an adequate complex operator allows us to characterize the solutions of the previous functional equation.