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$\mathcal{N}$-th ORDER DIFFERENTIAL INEQUALITIES IN THE COMPLEX PLANE

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Abstract: There are numerous articles dealing with first and second order differential inequalities and differential subordinations and only three articles which are related to third order differential inequalities and subordinations. In this paper we generalise these inequalities for $\mathcal{N}$-th order differential inequalities for functions belonging to class of analytic functions f such that $f(0) = 0$.

Keywords and Phrases: Subordination, Differential subordination, Differential inequality, Maximum modulus.

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1. Introduction

Let U be the open unit disk in the complex plane $\mathbb{C}$, centered at origin, and let Ω and Δ be sets in $\mathbb{C}$. Let P be an analytic function defined on U, and D be a differential operator such that $D[P]$ is defined on U. Under what conditions on D, Ω and Δ that are needed so that

$$D[P] \subset \Omega \Rightarrow P(U) \subset \Delta \tag{1.1}$$

previous work has been done on first, second and third order differential inequalities of this type see ([2], [5]).

In this paper we intend to obtain concrete results on differential inequalities for the n-th order derivative for class of analytic functions.