Some strong differential subordinations using a differential operator

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ABSTRACT.

In the present paper we study the operator $RD_{\lambda,\alpha}^n f(z,\zeta)$ defined by using the extended Ruscheweyh derivative $R^n f(z,\zeta)$ and the extended generalized Sălăgean operator $D_\lambda^n f(z,\zeta)$, as $RD_{\lambda,\alpha}^n : \mathcal{A}_\zeta^* \to \mathcal{A}_\zeta^*$, $RD_{\lambda,\alpha}^n f(z,\zeta) = (1-\alpha)R^n f(z,\zeta) + \alpha D_\lambda^n f(z,\zeta)$, where $\mathcal{A}_{n\zeta}^* = \{f \in \mathcal{H}(U \times \overline{U}),\ f(z,\zeta) = z + a_{n+1}(\zeta) z^{n+1} + \ldots,\ z \in U,\ \zeta \in \overline{U}\}$ is the class of normalized analytic functions with $\mathcal{A}_{1\zeta}^* = \mathcal{A}_\zeta^*$. We obtain several strong differential subordinations regarding the extended operator $RD_{\lambda,\alpha}^n$. Some examples are presented.

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