

ON SOME SUFFICIENT CONDITIONS FOR p -VALENTLY STARLIKENESS

MAMORU NUNOKAWA AND JANUSZ SOKÓŁ

Abstract. In this paper we prove some properties for functions that are multivalent in the unit disc $|z| < 1$ in the complex plane. As a corollary we obtain that if $f(z)$ is p -valent, $p \geq 10$, and

$$\left| \arg \left\{ f^{(p)}(z) \right\} \right| < \pi$$

in $|z| < 1$, then $f(z)$ is p -valent starlike.

Mathematics subject classification (2020): Primary 30C45; Secondary 30C80.

Keywords and phrases: Univalent functions, starlike, convex, close-to-convex.

REFERENCES

- [1] K. NOSHIRO, *On the theory of schlicht functions*, J. Fac. Sci. Hokkaido Univ. Jap. **2** (1) (1934–35) 129–135.
- [2] M. NUNOKAWA, *On the theory of multivalent functions*, Tsukuba J. Math. **11** (2) (1987) 273–286.
- [3] M. NUNOKAWA, *A note on multivalent functions*, Tsukuba J. Math. **13** (2) (1989) 453–455.
- [4] M. NUNOKAWA, *On the order of strongly starlikeness of strongly convex functions*, Proc. Japan Acad. Ser. A **69** (7) (1993) 234–237.
- [5] S. OZAKI, *On the theory of multivalent functions*, Sci. Rep. Tokyo Bunrika Daigaku Sect. A **2** (1935) 167–188.
- [6] S. WARSCHAWSKI, *On the higher derivatives at the boundary in conformal mapping*, Trans. Amer. Math. Soc. **38** (1935) 310–340.