

# A Certain Class of Harmonic Mappings Related to Functions of Bounded Radius Rotation

Yasemin Kahramaner<sup>1,\*</sup>, Yaşar Polatoğlu<sup>2</sup> and Arzu Yemişçi Şen<sup>2</sup>

<sup>1</sup> Department of Mathematics, İstanbul Ticaret University, İstanbul, Turkey  
ykahramaner@iticu.edu.tr

<sup>2</sup> Department of Mathematics and Computer Sciences, İstanbul Kültür University,  
İstanbul, Turkey  
y.polatoglu@iku.edu.tr; asen@iku.edu.tr

**Abstract.** Let  $R_k$  be the class of functions with bounded radius rotation and let  $S_H$  be the class of sense-preserving harmonic mappings. In the present paper we investigate a certain class of harmonic mappings related to the function of bounded radius rotation.

**Keywords:** Harmonic mapping, bounded radius rotation, distortion theorem, growth theorem and radius of starlikeness.

## 1 Introduction

Let  $\mathcal{A}$  be the class of functions in the open unit disc  $\mathbb{D}$  that are normalized with  $h(0) = 0, h'(0) = 1$ , then a function  $h(z) \in \mathcal{A}$  is called convex or starlike if it maps  $\mathbb{D}$  onto a convex or starlike region, respectively. Corresponding classes are denoted by  $\mathcal{C}$  and  $S^*$ . It is well known that  $\mathcal{C} \subset S^*$ , that both are subclasses of the univalent functions and have the following analytical representations.

$$h(z) \in \mathcal{C} \iff \operatorname{Re} \left( 1 + z \frac{h''(z)}{h'(z)} \right) > 0, \quad z \in \mathbb{D} \quad (1)$$

and

$$h(z) \in S^* \iff \operatorname{Re} \left( z \frac{h'(z)}{h(z)} \right) > 0, \quad z \in \mathbb{D} \quad (2)$$

More on these class can be found in [2]. Let  $h(z)$  be an element of  $\mathcal{A}$ . If there is a function  $s(z)$  in  $\mathcal{C}$  such that

$$\operatorname{Re} \left( \frac{h'(z)}{s'(z)} \right) > 0, \quad z \in \mathbb{D} \quad (3)$$

then  $h(z)$  is called close-to-convex function in  $\mathbb{D}$  and the class of such functions is denoted by  $\mathcal{CC}$ .

<sup>0</sup> Corresponding Author\*

2010 AMS Mathematics Subject Classification:30C45