

**SOME NEW REFINEMENTS OF STRENGTHENED HARDY  
AND PÓLYA–KNOPP’S INEQUALITIES**

ALEKSANDRA ČIŽMEŠIJA<sup>1</sup>, SABIR HUSSAIN<sup>2</sup> AND JOSIP PEČARIĆ<sup>3</sup>

<sup>1</sup>DEPARTMENT OF MATHEMATICS, UNIVERSITY OF ZAGREB, CROATIA

<sup>2</sup>ABDUS SALAM SCHOOL OF MATHEMATICAL SCIENCES, GC UNIVERSITY, LAHORE, PAKISTAN

<sup>3</sup>FACULTY OF TEXTILE TECHNOLOGY, UNIVERSITY OF ZAGREB, CROATIA

ABSTRACT. We prove a new general one-dimensional inequality for convex functions and Hardy–Littlewood averages. Furthermore, we apply this result to unify and refine the so-called Boas’s inequality and the strengthened inequalities of the Hardy–Knopp–type, deriving their new refinements as special cases of the obtained general relation. In particular, we get new refinements of strengthened versions of the well-known Hardy and Pólya–Knopp’s inequalities.