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Monotonicity of the Jensen Functional for f-Divergences via the Zipf-Mandelbrot Law

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Abstract : The Jensen functional in its discrete form is brought in relation to the Csiszar divergence functional, this time via its monotonicity property. This approach presents a generalization of the previously obtained results that made use of interpolating Jensen-type inequalities. Thus the monotonicity property is integrated with the Zipf-Mandelbrot law and applied to f-divergences for probability distributions that originate from the Csiszar divergence functional: Kullback-Leibler divergence, Hellinger distance, Bhattacharyya distance, chi-square divergence, total variation distance. The Zipf-Mandelbrot and the Zipf law are widely used in various scientific fields and interdisciplinary and here the focus is on the aspect of the mathematical inequalities.

Keywords : Jensen functional, monotonicity, Csiszar divergence functional, f-divergences, Zipf-Mandelbrot law
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