

On the monotonicity of generalized barycentric coordinates on convex polygons

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Generalized barycentric coordinates (GBCs) have several applications, including triangular mesh parameterization, and morphing and image deformation, as well as to allow more flexibility in designing shape functions for the finite element method. So it seems worthwhile to derive some basis properties of GBCs. A property that is shared by many well known kinds of GBCs on a convex polygon is a monotonicity property: the coordinate function associated with each vertex is monotonically increasing in the direction towards the vertex. I will discuss how to derive this property for various GBCs and also explore the question of whether some GBCs are also convex in these same directions.

References

- [1] M. S. Floater. Generalized barycentric coordinates and applications. *Acta Numerica*, 24:227–229, 2015.
- [2] M. S. Floater, On the monotonicity of generalized barycentric coordinates on convex polygons. *Comp. Aided Geom. Design*, 42:34–39, 2016.