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# Numerical Quadrature for Gregory Quads

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We investigate quadrature rules for quadrilateral Gregory patches [1], in short Gregory quads. We provide numerical and where possible symbolic quadrature rules for the space of twenty polynomial/rational functions associated with Gregory quads, as well as their derivatives, products, and products of derivatives, i.e., the derived (isogeometric) spaces. This opens up the possibility of incorporating Gregory quads in numerical simulations [2] without having to resort to imprecise quadratures.

## REFERENCES

[1] A. Gregory, Smooth interpolation without twist constraints, Computer aided geometric design, Elsevier, 1974, pp. 71–87.

[2] J.A. Cottrell, T.J. Hughes, Y. Bazilevs, Isogeometric analysis: toward integration of CAD and FEA, John Wiley & Sons, 2009.