

# Multivariate polynomial interpolation on Lissajous-Chebyshev nodes

P. Dencker <sup>1</sup>, W. Erb <sup>2</sup>

*Institute of Mathematics, University of Lübeck*

<sup>1</sup> *E-mail: dencker@math.uni-luebeck.de*

<sup>2</sup> *E-mail: erb@math.uni-luebeck.de*

In this contribution, we study multivariate polynomial interpolation and quadrature rules on non-tensor product node sets linked to Lissajous curves and Chebyshev varieties. After classifying multivariate Lissajous curves and the interpolation nodes related to these curves, we derive a discrete orthogonality structure on these node sets. Using this discrete orthogonality structure, we can derive a unique polynomial interpolant in an appropriately defined space of multivariate Chebyshev polynomials. We show how this polynomial interpolant can be computed in an efficient way by using fast Fourier methods. Our results generalize corresponding interpolation and quadrature results for the Chebyshev-Gauß-Lobatto points in dimension one and the Padua points in dimension two.