

## N-COHERENT PAIRS OF MEASURES

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Let us introduce the Sobolev type inner product  $\langle f, g \rangle = \langle f, g \rangle_1 + \lambda \langle f', g' \rangle_2$  where  $\lambda > 0$  and

$$\langle f, g \rangle_1 = \int_{-1}^1 f(x)g(x)(1-x)^\alpha(1+x)^\beta dx,$$

$$\langle f, g \rangle_2 = \int_{-1}^1 f(x)g(x) \frac{(1-x)^{\alpha+1}(1+x)^{\beta+1}}{\prod_{k=1}^M |x - \xi_k|^{N_k+1}} dx + \sum_{k=1}^M \sum_{i=0}^{N_k} M_{k,i} f^{(i)}(\xi_k) g^{(i)}(\xi_k),$$

with  $\alpha, \beta > -1$ ,  $|\xi_k| > 1$ , and  $M_{k,i} > 0$ , for all  $k, i$ . A Mehler-Heine type formula, the inner strong asymptotics on  $(-1, 1)$  as well as some estimates for the polynomials orthogonal with respect to the above Sobolev inner product are obtained. Necessary conditions for the norm convergence of Fourier expansions in terms of such Sobolev orthogonal polynomials are given (see [1]).

Some extensions of these results for other classical measures are analyzed.

## References

- [1] B. Xh. Fejzullahu, F. Marcellán *Jacobi-Sobolev Orthogonal Polynomials. Asymptotics for N-coherence of measures*, J. Ineq. Appl. (2011). In press.