Master degree course on
Approximation Theory and Applications,

Lab exercises

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1. Write a script that construct the Dubiner, Morrow-Patterson and Padua points on the square $[-1,1]^2$ for $n \leq 20$.

2. For those point sets, compute the corresponding Lebesgue constants (use a grid of 70×70 of equispaced points). To this end use the function

   `http://www.math.unipd.it/~marcov/mysoft/wam/wamleb.m`.

3. Finally, construct the interpolant

$$p_n[f](\mathbf{x}) = \sum_{i=1}^{N} l_i(\mathbf{x}) f(\mathbf{x}_i), \quad \mathbf{x} = (x,y) \in [-1,1]^2,$$

   where $\mathbf{x}_i$ are the interpolating points, $N = (n+1)(n+2)/2$ the dimension of the polynomial space.

   As f consider the functions $f(x,y) = (x^2+y^2)^{5/2}$ and $f(x,y) = (x^2+y^2)^{1/2}$.

   Hint: the interpolant can be computed by modifying the function

   `http://www.math.unipd.it/~marcov/mysoft/wam/wamfit.m`