



Numerical Algorithms

Winter Semester 2015
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Exercise Sheet 10.

Due date: **Tuesday, 19.1.16.**

Exercise 1. (Interpolation)

Prove theorem 3.5

(6 points)

Exercise 2. (Inverse trace inequality)

Consider a polynomial u_h , of order N , defined on $D = [0, h]$. Express

$$u_h(x) = \sum_{n=0}^N \hat{u}_n L_n(x), \quad (1)$$

where $L_n(x)$ denote the normalized Legendre polynomial of order n . Prove that

$$\|u_h\|_{\partial D} \leq \frac{N+1}{\sqrt{h}} \|u_h\|_D. \quad (2)$$

(4 points)