

ChEg 542
Fall 1998
HW #3
Due 9/26/98

1. Show that the inner product, $(x,y) = \sum_{i=1}^n \xi_i \bar{\eta}_i$ satisfies the requirements of

- a. Conjugate symmetry
- b. Linearity
- c. Positiveness

and thus is a suitable inner product.

2. Show that the weighted inner product, $(x,y) = \sum_{i=1}^n \xi_i w_i \bar{\eta}_i$ satisfies the requirements of

- a. Conjugate symmetry
- b. Linearity
- c. Positiveness

and thus is a suitable inner product. Be sure to state any restrictions on w .

3. Show that the Euclidean norm $\|x\| = \sqrt{\sum_{i=1}^n |\xi_i|^2}$, satisfies

- a. Scalar multiplication, i.e. $\|\alpha x\| = |\alpha| \|x\|$
- b. Positiveness
- c. Triangle inequality

4. Linear regression:

Use theory or "experiment" (i.e., numerical experiment) to determine how the error in typical fit coefficients scales with

- a. the number of points in the sample.
does it matter how they are distributed over the interval?
- b. The "noise" or uncertainty in the measurements.

You will need to define the problem clearly before you can answer a and b.