

Revision: Chapter 4: Inner product spaces

You should be able to do the following:

- Define what a real inner product space is, and what the norm of a vector (with respect to a real inner product) is.
- Give an example of real inner product for the real vector spaces $\mathbb{R}^n$, P_n and $M(2, 2)$.
- Decide whether certain functions are inner products or not (as in Exercise Sheet 6, question 1).
- Given a real inner product space, define what it means for two vectors to be orthogonal, for a set of vectors to be orthogonal and for a set of vectors to be orthonormal.
- In a given inner product space, calculate the inner product between two vectors and the norm of a vector (as in Exercise Sheet 6, questions 2,3).
- In a given inner product space, decide whether certain sets are orthogonal, orthonormal, both or neither (as in Exercise Sheet 6, question 4).
- Use the Gram-Schmidt process to construct an orthonormal basis from a given basis for a real inner product space (as in Exercise Sheet 7, questions 1,2,3,4)