

Read Section 6.6 and pages 53-54 on Lagrange interpolation, then answer the following.

1. Let f_i be the Lagrange polynomials in $P_n(\mathbb{R})$ corresponding to some distinct scalars $c_0, c_1, \dots, c_n \in \mathbb{R}$. Let $g \in P_n(\mathbb{R})$ be defined to be $g = \sum_{i=0}^n b_i f_i$ for some (not necessarily distinct) scalars b_0, b_1, \dots, b_n . What is the value of the $g(c_j)$?
2. Let $T: V \rightarrow V$ be a linear operator on a finite-dimensional inner product space V .
 - (a) Show that if T is an orthogonal projection then $\|T(v)\| \leq \|v\|$ for all $v \in V$. You may want to type something like `norm(v)` for $\|v\|$. (Hint: use the triangle inequality).
 - (b) Give an example of a projection for which this inequality does not hold.
 - (c) What can you say about T if the inequality is actually an equality for all $v \in V$?