Research Problems

Let A be a symmetric matrix with minimal polynomial

$$Z(x) = \prod_{i=0}^{d} (x - \lambda_i).$$

1. Study the polynomial $H_i(x) = \frac{Z(x)}{x-\lambda_i}$ and its relations with eigenvectors corresponding to λ_i.
2. Find an orthogonal basis $\{p_0(x), p_1(x), \ldots, p_d(x)\}$ of $\mathbb{R}_d[x]$ such that $H_i(x)$ has a nice representation in this basis.