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Consider the (real) inner product on $\mathcal{P}_2$ defined by

$$\langle p, q \rangle = \int_{-1}^{1} p(x)q(x)\, dx.$$

A real inner product is a symmetric positive bilinear form, so in any given basis it is represented by some symmetric positive definite matrix A. What is the matrix for this inner product for the power basis?