

Theory of Matrices
Home Work 8, due Thursday, March 16.
Instructor: Prof. Artem Zvavitch

Problem 1. Find an orthogonal matrix P whose first row is $(2/3, -1/3, 2/3)$.

Problem 2. Assume P is an orthogonal matrix prove that

- $\langle Pu, Pv \rangle = \langle u, v \rangle$, for all $u, v \in V$.
- $\|Pu\| = \|u\|$ for all $u \in V$.

Problem 3. Describe all orthogonal matrices in \mathbb{R}^2 .

Problem 4. Find the matrix A that represents the usual inner product in \mathbb{R}^2 relative to the basis $u_1 = (1, 2)$ and $u_2 = (-1, 3)$.

Problem 5. Is it true that the sum of two positive definite matrices is positive definite matrix? Is it true that the set of all n by n positive definite matrices is a vector space?