

Homework 7: Euclidean spaces

1. Problem 8.1 from Janisch
2. Problem 8.2 from Jänisch, but there is a typo in the matrix A – it should be symmetric, i.e., a_{23} should be 1, not 0)
3. (a) Prove that for any real numbers a_1, \dots, a_n satisfying $a_1 + \dots + a_n = 1$, we have

$$a_1^2 + \dots + a_n^2 \geq \frac{1}{n}.$$

- (b) Find the minimum of the function $f(x_1, \dots, x_n) = x_1^2 + \dots + x_n^2$ on the hyperplane $x_1 + \dots + x_n = 1$.
4. Find the maximum of the function $x + 2y + 3z$ on the unit sphere $x^2 + y^2 + z^2 = 1$.
5. Problem 2 chapter 15 (p. 129) from Curtis
6. Problem 6 chapter 15 (p.129) from Curtis