

## THE PROBLEM

### Mathematical Model for the Problem

The problem is to find the maximum value of the function  $f(x, y, z) = x^2 + y^2 + z^2$  subject to the constraint  $g(x, y, z) = x + y + z = 1$ . The domain of the function is the set of all real numbers  $x, y, z$  such that  $x + y + z = 1$ . The function  $f(x, y, z)$  is a quadratic function and the constraint  $g(x, y, z)$  is a linear function. The maximum value of  $f(x, y, z)$  is achieved when  $x = y = z = \frac{1}{3}$ . The maximum value of  $f(x, y, z)$  is  $\frac{1}{3}$ .