Continuous Optimization

Daniel Mao

Contents

1 Constrained Optimization **1**

1.1 Definitions 1

Chapter 1

Constrained Optimization

Let $f : \mathbb{R}^n \to \mathbb{R}$, $g : \mathbb{R}^n \to \mathbb{R}^m$, and $h : \mathbb{R}^n \to \mathbb{R}^p$. Consider the following optimization problem

$$\begin{array}{lll} \text{(P)} & \inf & f(x) \\ & \text{subject to:} & g(x) \leq \mathbb{0} \\ & & h(x) = \mathbb{0} \\ & & x \in \mathbb{R}^n. \end{array}$$

Let $S \subseteq \mathbb{R}^n$ denote the feasible region.

1.1 Definitions

DEFINITION 1.1 (Local Minimizer)**.** ...

DEFINITION 1.2 (Active Set)**.** Let $x \in S$. We define the **active set** at x, denoted by $\mathcal{A}(x)$, to be a subset of $\{1, ..., m\}$ given by

$$\mathcal{A}(x) := \{i \in \{1, ..., m\} : g_i(x) = 0\}.$$

We say that the inequality constraint $g_i(x) \leq 0$ is **active** if and only if $g_i(x) = 0$; and say that it is **inactive** if and only if $g_i(x) < 0$.