**FRONTIERS IN OPTIMIZATION AND CONTROL**

**S.H. Hou, X.M. Yang and G.Y. Chen (eds)**

# 1 METHODS IN OPTIMIZATION

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**Abstract:** It is known that optimization is useful ...

**Key words:** optimization theory, optimization method.

## 1 INTRODUCTION

Optimization has many applications in finance and engineering in e.g., (Bertsekas (1976))....

## 2 AN OPTIMIZATION PROBLEM

### *2.1 this is subsection title*

Consider the following constrained optimization problem (P):

$$\begin{array}{ll} \inf\limits_{x \in X} & f_0(x) \\ \text{subject to} & f_i^2(x) \leq 0, \quad i = 1, \cdots, m, \end{array}$$

where $X \subset R^n$ is a subset of $R^n$, $f_i : X \to R,\ i = 0, 1, 2, \cdots, m$ are real-valued functions.

**Definition 2.1** *The Lagrangian function of (P) is defined as*

$$L(x, \lambda) = f_0(x) + \sum_{i=1}^{m} \lambda_i f_i(x). \tag{2.1}$$

**Figure 3.1** Short caption.

**Figure 3.2** This caption will go on the left side of the page. It is the initial caption of two side-by-side captions.

**Figure 3.3** This caption will go on the right side of the page. It is the second of two side-by-side captions.

**Lemma 2.1** *If all $f_i$ are convex, then the Lagrangian is convex.*

**Proof:** Follows directly from the definition of $\phi$.

**Theorem 2.1** *(Weak duality)*

$$f_0(x) \geq 0. \tag{2.2}$$

It is also not difficult to see that an equality constraint, if any, can be easily converted into two inequality constraints. Thus our results are applicable to optimization problems with both inequality and equality constrained optimization problems, see Example 1.

Next we consider the case when $X$ is a discrete set but has an infinite number of elements. The proof of next result is similar to that of Theorem **??**, see also (**??**) with some modification to allow for the case that $X$ is now a discrete set but has an infinite number of elements. In Bertsekas (1976) the case that $X$ is a connected set was considered.

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# 3 ALL THE THINGS THAT CAN BE DONE WITH FIGURE CAPTIONS

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**Figure 3.4** This caption is not continued so it has a new caption number.

**Figure 3.5** This is a narrow caption so that it can be at the side of the illustration. This is a narrow caption. This is a narrow caption. This is a narrow caption.

**Figure 3.5** *(continued)* This is a narrow continued caption. This is a narrow continued caption. This is a narrow continued caption.

**Figure 3.6a** Lettered caption.

**Figure 3.6b** One caption.

**Figure 3.6c** Two captions.

## 4 MAKING TABLES

Notice that the caption should be at the top of the table. Use a line above the table, under the column heads, and at the end of the table. This form of the tabular command makes the table spread out to the width of the page.

**Table 4.1** Effects of the Two Types of Scaling Proposed by Dennard and Co-Workers.[a,b]

| *Parameter* | $\kappa$ *Scaling* | $\kappa$, $\lambda$ *Scaling* |
|---|---|---|
| Dimension | $\kappa^{-1}$ | $\lambda^{-1}$ |
| Voltage | $\kappa^{-1}$ | $\kappa^{-1}$ |
| Currant | $\kappa^{-1}$ | $\lambda/\kappa^2$ |
| Dopant Concentration | $\kappa$ | $\lambda^2/\kappa$ |

[a] Refs. 19 and 20.
[b] $\kappa, \lambda > 1$.

**Table 4.2a** A small table with a lettered table caption.

| $\alpha\beta\Gamma\Delta$ *One* | *Two* | *Three* |
|---|---|---|
| one | two | three |
| one | two | three |

**Table 4.3** Here is a table caption.

| *Cell* | *Time (sec.)* |
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| 1 | 432.22 |
| 2 | 32.32 |
| 3 | 2.32 |

**Table 4.3** *(continued)* This is a continued caption.

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|---|---|
| 4 | 532.22 |
| 5 | 12.02 |
| 6 | 4.44 |

## 5 CONCLUSIONS

In this sample file, the requirements on how to prepare the book chapter using the Kluwer style file were given.

### Acknowledgments

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## Appendix

This is an appendix without a title.

## References

Ahuja, R.K., Magnanti, T.L. and Orlin, J.B. (1993), *Network flows*, Prentice Hall, Englwood Cliffs, New Jersey.

Bertsekas, D.P. (1976), Nondifferentiable optimization via approximation, *Mathematical Programming*, Vol. 3, pp. 1-25.