PRACTICAL OPTIMIZATION: A GENTLE INTRODUCTION

John W. Chinneck
Systems and Computer Engineering
Carleton University
Ottawa, Canada

Available online at
www.sce.carleton.ca/faculty/chinneck/po.html.
This version as at November 6, 2012.

TABLE OF CONTENTS

Chapter 14: Heuristics for Discrete Search: Genetic Algorithms and Simulated Annealing. Some problems are just too big for branch and bound, in which case you must abandon the guarantee of finding the optimum solution and instead opt for heuristic methods which can only guarantee to do fairly well most of the time. Genetic Algorithms and Simulated Annealing are two popular heuristic methods for use on very large problems.

Chapter 15: Dynamic Programming. This optimization technique builds towards a solution by first solving a small part of the whole problem, and then gradually incrementing the size in a series of stages until the whole problem is solved. Efficiency results from combining the local solution for a stage with the optimum found for a previous stage. We look at the simplest deterministic discrete cases.

Chapter 16: Introduction to Nonlinear Programming (NLP). NLP is a lot harder than linear programming. We start by looking at the reasons for this. Next we look at the simplest method for solving the simplest type of NLP: unconstrained problems that consist only of a nonlinear objective function. The method of steepest ascent/descent is described.

See the online algorithm animations linked from www.sce.carleton.ca/faculty/chinneck/po.html.