Part 4

Swarm intelligence algorithms

As we advance in our exploration of optimization algorithms, this part will immerse you in the world of collective intelligence. Here, you'll discover the power of swarm intelligence algorithms, including particle swarm optimization, ant colony optimization, and artificial bee colony. Through the two chapters in this part, you'll witness how nature-inspired swarming behaviors can be harnessed to find optimal solutions.

In chapter 9, you'll learn about swarm intelligence and dive deep into particle swarm optimization (PSO). You'll gain an understanding of how swarms of particles collectively explore solution spaces to find optimal answers. You'll explore continuous PSO algorithms, delve into binary PSO for discrete problems, and understand permutation-based PSO for combinatorial optimization. You'll discover how to adapt PSO to strike a balance between exploration and exploitation and see how it can efficiently solve both continuous and discrete optimization problems.

Chapter 10 will broaden your horizons as you explore other swarm intelligence (SI) algorithms. You'll get familiar with the principles of ant colony optimization (ACO) metaheuristics and understand different variants of ACO that cater to various problem types. Additionally, you'll delve into the world of artificial bee colony (ABC) algorithms and grasp the adaptation aspects that make SI algorithms so versatile. You'll witness how these SI algorithms can be applied to address a wide range of continuous and discrete optimization problems.