

Part I

Methodologies

Introduction

This book is about problem-solving in management of systems engineering cases. The content is presented in two parts, one for methodologies and the second for techniques. In the first chapter, a methodology for the diagnosis of the organization dynamics is discussed from the point of view of the complexity approach in order to improve and solve problems related to its operation and management.

The author of the second chapter reasons about a process for building trend in planning scenarios for problem-solving in public and private organizations by five phases: (1) system definition and explanation of the current situation, (2) integration of forecasts, (3) integration of the predictions, (4) the construction of the future image, and (5) a description of the connection between the present and the future.

The third chapter is dedicated to explaining the organizational consulting ineffectiveness where three reasons are presented. Two of those reasons are associated with the actors involved in the consulting process; the third reason is associated with the intervention process in problem-solving.

In the fourth chapter, the objective of the author is to identify the technological, economic, and usage ruptures, for the purpose of showing their importance in the stabilization of a process, aimed at reaching a transformation, named the innovation process. In problem-solving, the innovation will be considered as “the introduction of a new or significantly improved product or process, of a new marketing or organizational method in the company’s internal practices or external relations.”

The author of the fifth chapter presents and discusses a methodology to analyze, under a systemic approach, the visual reasoning processes given with the use of mathematical representations when learning differential calculus, at a high school level. The interest of the research focuses on recognizing how the students acquire and use some systems of mathematical representation and how they organize them to produce acceptable answers in the school environment.