

Preface

In 2008 the idea of writing a book on issues of automatic control of mineral processes was suggested by Professor Michael Johnson and discussed between three Chilean academics working in this field, each belonging to a different University (Daniel Sbarbaro from Universidad de Concepción, Guillermo Gonzalez from Universidad de Chile and Aldo Cipriano from Pontificia Universidad Católica de Chile). During the 12th IFAC International Symposium on automation in Mining, Mineral and Metal Processing organized by Université Laval in Québec City (August 2007) the decision to integrate this automation group of researchers was adopted. As such, four new professors, Daniel Hodouin, René del Villar, André Desbiens and Carl Duchesne, each contributing with his particular field of expertise, joined the endeavor.

This book provides an up-to-date review of modern automation developments at industrial level, highlighting the main role played by modeling, control theory and measuring systems in the design and operation of effective supervisory strategies for mineral processing processes. It describes how to use dynamic models of major equipments in the design of automatic control, data reconciliation and soft sensing schemes. Through examples, it illustrates modern design tools for integrating simulation and control system design for comminution (crushing, grinding) circuits and flotation columns. It fully covers the design of soft sensors based on standard single point measurements and those based on more complex measurements, such as digital images. It surveys the main issues concerning steady-state and dynamic data reconciliation and their application to the design of instrumentation architectures and fault diagnosis systems for the mineral processing processes. Considering that most mineral processing plants have distributed control systems and information management systems, this book also describes the current platforms and toolkits available for implementing these advanced data processing and control systems. Some applications to real mineral processing plants or laboratory/pilot scale set-ups highlight the benefits obtained with the techniques described in the book.

The book will benefit engineers working in the mineral processing industry by providing valuable tools and information about the use of modern software platforms and techniques. It is also of interest to senior students of chemical, metallur-

gical and electrical engineering looking for applications of control technology to mineral processing plants. Control engineers and academics will find the industrial application areas for the new control techniques of general interest.

The editors would like to thank the book's contributors for the work accomplished, and the numerous students that, at each extreme of the American continent, have contributed to the results presented by their professors (naming all of them would be almost impossible). A special word of thanks is addressed to Prof. Michael Johnson and Aislinn Bunning from Springer, whose encouragement and technical support was instrumental to the conclusion of the book.

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