Preface

The revised and updated version of the original *Real-Time Stability in Power Systems* is most timely, given the myriad changes in the electric power industry and the significant technology advances in computing, control and communications fields since its initial publication. Dr. Savulescu and his hand-picked group of experts have accomplished an impressive effort to provide in a single tome a comprehensive treatment of the power system real-time stability assessment area.

While the physics of the power systems has not changed in the liberalized, competitive electricity market environment, within which they operate, the decision making process has undergone major transformations as an aftermath of the restructuring in the industry. The rapidly evolving implementation of the *smarter grid* has impacted significantly the quality and quantity of data available around the clock to system operators. Indeed, the establishment of the Advanced Metering Infrastructure (*AMI*) in many power systems and the growing presence of Phasor Measurement Units (*PMU*s) in interconnected networks are two salient features of the new power system. The massive amounts of data brought in 24×7 by these new devices—the so-called *Big Data* explosion—represents the reality of the environment in which today's operators make real-time decisions. The new book provides the basis for the construction of the analytics to deal with the multiple facets of the huge masses of data that are collected, stored and processed for arriving at decisions based on improved and more timely information.

The original version of the book was an explicit acknowledgment that the electric power industry was shifting away from the seat-of-the-pants, hand waving methods of the past to formal approaches based on a solid analytical footing that make detailed use of system and network theoretic concepts. Since that time, many of the approaches have matured and come of age and the power industry has garnered valuable experience in their deployment. Indeed, we have witnessed the broader acceptance of the metrics to quantify the distance to instability as a useful measure to reflect the risk of a reliability event. In addition, the introduction of effective visualization tools has made possible the improved comprehension of the power system state in the dynamic regime. Also, the better understanding of dynamic phenomena in voltage stability, the application of appropriate tools from control and communications domains and the advancements in computing have brought about

major progress in the formulation and implementation of effective control strategies for the power grid.

The new version of the book captures all these important developments and incorporates them in the revised edition. Together with the newly added chapters, the book offers a comprehensive treatment of the essential components of decision support systems for dynamic stability. Their effective deployment can undoubtedly result in more timely decisions, incorporating better information, in this critically important area of power system operations and control. The book is destined to become an essential reference for industry practitioners and academic researchers.

I conclude this section with my heartfelt congratulations to Dr. Savulescu and his team of experts in the production of this new and important reference tome. I also express my hope that, given the many new developments underway in microgrids, renewable resource integration and distributed decision making, to name just a few areas, the updated version of the next edition will be available with a shorter lapse in time than the present one.

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