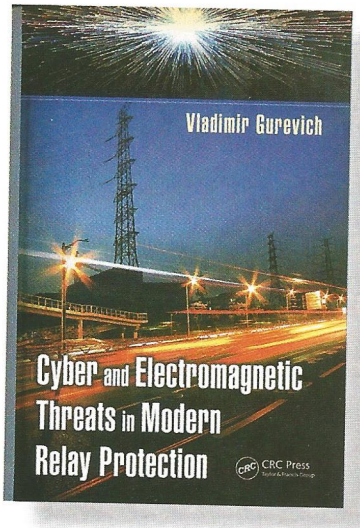
by Alexander Apostolov, USA

Cyber and Electromagnetic Threats in Modern Relay Protection

1st Edition



We live in a dramatically changing world characterized by two major trends - the world around us is becoming connected through different forms of communications, while the political situation in many parts of the world is becoming more unstable. These two trends are the driving forces behind the book by Vladimir I. Gurevich. He grew up in the former Soviet Union at the time of the Cold War, which obviously has an impact on his view of the world and the threats that we face in our lives.

Dr. Gurevich's life experience and professional background give him a point of view that zooms into the challenges that the modern state-of-the-art PAC devices and systems face in the world of wide spread communications based connectivity and global political instability.

The author's goal is to convince the readers of the seriousness of the cyber and electromagnetic threats by providing a detailed overview of the vulnerabilities of digital protection relays to natural and intentional destructive impacts, including cyber-attacks and electromagnetic intrusions.

The two hundred pages of the book are divided in six chapters. The first chapter presents a brief overview of what the author considers dangerous tendencies in the technological advances in relay protection. The increasing levels of functional integration in protection IEDs and the development and implementation of smart grid technologies are considered dangerous from his point of view.

The second chapter focuses on the impact of natural electromagnetic events on digital protection relays. It analyzes different types of events, how they can affect protection IEDs and some of the measures taken by the manufacturers to limit their impact.

Chapter 3 looks at the impact of intentional electromagnetic attacks on protection IEDs. High altitude nuclear blasts may have a significant electromagnetic effect. Specialized weapons that according to the author can produce high power electromagnetic emissions have been developed by several countries since the time of the Cold War and represent another threat to protection IEDs.

The following chapter analyzes cyber threats and the applicability of conventional cyber security methods for the protection of IEDs from cyber-attacks.

Chapter 5 proposes some passive and active methods for reducing the vulnerability of protection IEDs to electromagnetic and cyber-attacks.

The last chapter of the book introduces the concept of what the author calls "unification." It calls for standardization of different hardware modules and their interchangeability between devices from the same or different manufactures, combined with standardized and user friendly IED configuration tools. This will allow the quick replacement of IEDs or their components following a destructive attack.

While the book provides an analysis of the impact of electromagnetic attacks on protection IEDs it would have been useful to compare it with the impact of the same events on electromechanical and solid-state relays. It also does not look at the importance of time synchronization and the impact of natural or intentional events on it.

The book is still a good reference for protection specialists involved in the design and application of protection devices and systems, as well as for academics and researchers ■

Dr. Gurevich received M.S.E.E. and Ph.D. degrees from universities in Kharkov Ukraine. He started his career in academia later becoming associate professor at the Kharkov National Technical and Agricultural University and head of research laboratory in the university. He was also Chief Engineer and Director of Inventor, Ltd (Kharkov, Ukraine). His military service specialization was related to tactical ballistic missile systems. In 1994 he moved to Israel and today works at the Israel Electric Corp. as a Senior-Specialist and Head of the section of the Central Electric Laboratory.

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