

## Review of “RADAR – Concise Course—Volumes 1 and 2” by Nadav Levanon

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Professor Nadav Levanon, one of the world’s foremost authorities on radar, with a lifetime’s experience and expertise of both teaching and researching, has published a new two-volume introductory e-book on radar, *Radar—Concise Course, Volume 1* [1] and *Radar—Concise Course, Volume 2* [2]. The radar community is fortunate to already have a number of wonderfully written texts introducing this complex and varied subject. Therefore, any new comer, covering this well-trodden territory, must successfully rise to the challenging trick of offering material that both enhances and enriches existing books, while simultaneously offering genuinely new perspectives that help to deepen the reader’s overall understanding.

Professor Levanon has distilled a lifetime’s experience and expertise into this new two-volume book to provide comprehensive, clear, and detailed explanations of the fundamentals that underpin the topic of radar. It is an open access book, self-published, and only available in electronic form. Based on the author’s teaching course, delivered and refined over a period of more than 30 years, it provides the reader with a sound foundation for understanding and applying basic concepts. Equally, it also acts as an ideal launch point for those wishing to progress to more detailed and specific studies above-and-beyond graduate level.

A glance at the contents pages shows that all the core topics comprising a modern radar system are extensively covered. There is a particular emphasis placed on radar signal processing. This not only reflects the author’s own area of research specialization but also acknowledges that radar signal processing has progressively become a more and more fundamental and substantial part of a radar system. The material covered is very much of an introductory nature and does not stray far from classic monostatic

concepts that make up the vast majority of radar systems in use today. This does mean that more advanced concepts, such as MIMO, cognitive radar, and networked radar do not feature, although imaging radar, in the form of SAR, is nicely covered. Also, aspects such as clutter are only very briefly introduced. For example, there is little mention of the types of statistical models typically used in simple performance prediction and noise representations are instead used, again, aiding clarity of concept description. As a consequence, there is a healthy concentration on the fundamental building blocks that underpin the design and function of any radar system.

The book commences with a short historical overview that neatly summarizes some of the key contributions and contributors that led the development of radar toward the ubiquitously successful sensing system we know today. The book is also peppered throughout by a series of small vignettes that pay homage to the originators of the concepts being introduced. Indeed, it is these, together with a style of graphical presentation that is a reminder that this is a book that has transitioned from the classroom. This is no bad thing and I strongly suspect that it will therefore also provide an excellent and straightforward basis for educators to evolve the book back into classroom teaching material.

The book’s classroom origins also result in excellent graphics that, by themselves, offer a high degree of self-explanation. The graphics are supplemented by text descriptions that, generally, are more spartan than those typically accompanying diagrams and figures in other introductory radar books. Unsurprisingly, this graphics/text balance defines this book’s overall tone and approach and results in its somewhat unique character. This difference in character is a major strength given that there is no single book that can ever claim to be a sole “go to” introductory text. It is well known that students learning preferences vary greatly. Different books with their different styles and emphases appeal, in turn, to different individual students. Having a range of options greatly helps to cover all the bases. I always recommended a small and very hand-picked range of reading for my own introductory radar course. Nadav Levanon’s book will most definitely be added to my list, placing it, in my opinion, firmly amongst the best texts currently available.

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The book is also something of a family affair. The cover is a painting by the author's wife, suitably inspired by the author's research into waveforms and ambiguity. Perhaps, it shows a path through a field to the promised land of an unambiguous radar? However, after reading the book, it will be safely concluded that this particular ambiguity function is still a work in progress! In fact, on closing the book, the cover might be seen as an invitation for the curious reader to explore further the fascinating topic of waveform design. All in all, Professor Levanon has more than met the challenge of producing material that both enhances and enriches existing texts, while simultaneously offering genuinely new perspectives and insights

that deepens the reader's understanding. I have no doubt that this book will become a "must have" on the virtual shelves of radar students and practitioners alike.

## REFERENCES

- [1] N. Levanon, *Radar—Concise Course, Volume 1*. [Online]. Available: [https://www.eng.tau.ac.il/~nadav/levanon\\_radar\\_course\\_vol\\_1.pdf](https://www.eng.tau.ac.il/~nadav/levanon_radar_course_vol_1.pdf)
- [2] N. N. Levanon, *Radar—Concise Course, Volume 2*. [Online]. Available: [http://www.eng.tau.ac.il/~nadav/levanon\\_radar\\_course\\_vol\\_2.pdf](http://www.eng.tau.ac.il/~nadav/levanon_radar_course_vol_2.pdf)