

# Selected Publications

## ***Dr. Alexander Rukhlenko, SAW/BAW Consultant***

This collection of selected publications of Dr. Alexander Rukhlenko provides access to his scientific papers on Surface Acoustic Wave (SAW) filter design, modeling, simulation, [MATLAB®](#) (Mathworks) algorithms, and acoustic-wave devices, representing a broad spectrum of his research interests and professional activities.

### ***Research Topics Covered***

The collection of selected papers covers the theory, design, modeling, and simulation of SAW devices. In particular, the papers include:

- theoretical foundations of periodic bidirectional and unidirectional SAW interdigital transducers (IDTs)
- optimal and suboptimal design of linear- and nonlinear-phase IF SAW filters
- factorizational synthesis of SAW filters
- SAW filter synthesis and analysis in the quasi-static approximation
- charge-distribution and static-capacitance calculation for generalized IDTs
- admittance calculation for unapodized and apodized IDTs including radiation susceptance, conductance, and static capacitance
- mixed scattering matrix theory and its application to SAW filter modeling
- semi-heuristical author's model for simulation of periodic reflective unapodized and apodized IDTs
- practical simulation techniques and algorithms implemented by the author using MATLAB.

Overall, these selected publications of Dr. Alexander Rukhlenko focus on analytical and efficient numerical methods for designing and modeling SAW filters. Additionally, practical simulation examples illustrate modeling procedures, computational algorithms, SAW-device performance analysis, and interpretation of simulation results.

Furthermore, many of the presented methods and algorithms were developed with practical engineering applications in mind. Therefore, the SAW

publications of Dr. Alexander Rukhlenko combine theoretical analysis with efficient computational techniques suitable for the computer-aided design and optimization of practical SAW devices.

Moreover, a number of Dr. Alexander Rukhlenko's research results and engineering developments remain unpublished. Some of these contributions are described in other technical articles available on this website and can be accessed through download links on the main page.

### ***Research Objectives and Target Audience***

The papers contain advanced results developed and implemented by the author in the fields of periodic SAW transducer modeling, practical SAW filter design, MATLAB software development, and device-level simulations. Consequently, they may be of interest to experienced engineers, SAW researchers and designers, as well as graduate and postgraduate students working in the fields of SAW devices, RF filters, microwave electronics, and wireless communication systems.

In addition, the publications may serve as useful reference material for engineers involved in acoustic-wave device modeling, numerical simulations, and CAD software development.

### ***Paper Index and Navigation***

This page is structured as a reference index for quick navigation and convenient access to the publications.

**Click a publication title below to download the corresponding paper:**

#### ***List of Publications***

1. [\*Rukhlenko, A.S. Optimal and suboptimal synthesis of surface acoustic wave filters. Proc. 1992 IEEE Frequency Control Symposium, Hershey, NJ, USA, May 27-29, 1992, p. 371-377.\*](#)
2. [\*Rukhlenko, A.S. Optimal and suboptimal synthesis of SAW bandpass filters using the Remez exchange algorithm. IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 1993, vol. UFFC-40, No. 5, p. 453-459.\*](#)
3. [\*Rukhlenko, A.S. Factorizational synthesis of SAW bandpass filters. Proc. 1993 IEEE Frequency Control Symposium, Salt Lake City, Utah, USA, June 2-4, 1993, p. 806-812.\*](#)

4. [Rukhlenko, A.S. Closed-form solution of the electrostatic problem for generalized periodic SAW transducers. Proc. IEEE International Symposium on Surface Waves in Solid and Layered Structures, Moscow-St. Petersburg, Russia, May 17-23, 1994, p. 113-118.](#)
5. [Rukhlenko, A.S., Kiranov, V.S. Iterative design of SAW bandpass filters with arbitrary magnitude and phase specifications. Proc. IEEE International Symposium on Surface Waves in Solid and Layered Structures, Moscow-St. Petersburg, Russia, May 17-23, 1994, p. 119-122.](#)
6. [Rukhlenko, A.S. Charge distribution and capacitance calculation for generalized periodic SAW transducers using Floquet's technique. Proc. 1994 IEEE Ultrasonics Symposium, Cannes, France, Nov. 1-4, 1994, p. 325-329.](#)
7. [Rukhlenko, A.S. Closed-form admittance calculation for generalized periodic SAW transducers. Proc. 1995 World Congress on Ultrasonics, Berlin, Germany, Sep. 3-7, 1995, p. 79-82.](#)
8. [Rukhlenko, A.S. Nodal analysis of multitransducer SAW devices. Proc. 1995 IEEE Ultrasonics Symposium, Seattle, U.S.A., Nov. 3-7, 1995, p. 297-300.](#)
9. [Rukhlenko, A.S. Modeling of multiport surface acoustic wave devices. Proc. 1998 International Symposium on Surface Waves in Solid and Layered Structures, St. Petersburg, Russia, June 7-12, 1998, p. 178-183.](#)
10. [Rukhlenko A.S., Dzisiak A.B. Fast algorithm for admittance calculation of SAW transducers. Proc. 1998 International Symposium on Surface Waves in Solid and Layered Structures, St. Petersburg, Russia, June 7-12, 1998, p. 196-199.](#)
11. [Rukhlenko A.S. Design of SAW bandpass filters using weighted least squares \(WLS\) technique. Proc. 2005 IEEE Ultrasonics Symposium, Rotterdam, Netherlands, Sep. 18-21, 2005, pp. 2186-2189.](#)
12. [Rukhlenko A.S. Closed-form modeling of reflective SAW transducers with arbitrary polarity sequence and apodization. Proc. 2005 IEEE Ultrasonics Symposium, Rotterdam, Netherlands, Sep. 18-21, 2005, pp. 1556-1559.](#)
13. [Rukhlenko A.S. Iterative WLS design of SAW bandpass filters. IEEE Trans. Ultrason., Ferroelectrics, and Freq. Control, Special Issue on Modeling, Optimization, and Design of Acoustic Devices, 2007, vol. UFFC-54, No. 10, p. 1930-1935.](#)

Web version: [Selected Publications of Dr. Alexander Rukhlenko](#)