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Introduction to the Mathematics of Subdivision Surfaces. *By Lars-Erik Andersson and Neil F. Stewart.* SIAM, Philadelphia, 2010. $75.00. xxiv+356 pp., hardcover. ISBN 978-0-898716-97-9.

There are now four books on subdivision surfaces, [CDM, WW, PR] and this book, forming a spectrum from almost pure mathematics [CDM] to the engineering viewpoint [WW]. This book is toward the mathematical end, but is more accessible to read than [CDM].

The positive things from my point of view (as an engineer) are as follows:

- The title is accurate. It is about the mathematics. In fact, calling it an introduction is a bit over-modest: it is quite a lot more than an introduction.
- It is an excellent reference book. If you need a proof for some property you will either find it here or find a pointer to where it may be found in the literature. The 180 references are a fairly complete bibliography. I found only one error (not in a proof) and one perpetuation of half-true street wisdom. That is excellent accuracy.
- I was very pleased to see the use of centered functions, which exploit the symmetry far better than the usual notation.
- I was also very pleased to see masks called "masks" and stencils called "stencils," while being academically polite about authors who still call stencils "masks."

Every subdivision research group will want a copy.

The small niggles that I have are the following:

- Although it might be suitable as a textbook for courses on subdivision in mathematics departments, I do not expect computer science students to be able to appreciate it. The strong emphasis on detailed proofs is less appropriate there, where the interest is more in the results and how they are related.
- Every time I met a forward reference I had a nagging doubt that there might be a circular argument. No, I didn't actually find any, but the forward references are far too frequent for comfort.
- The error mentioned above is that at the foot of page 158 it is stated that the support of the $\sqrt{3}$ scheme is the 2-ring. (This is echoed on page 172.) That is not true. The support lies within the 2-ring, as is proven, but its boundary is a fractal. See [ISD] for the proof and for a construction of support boundaries.
- The Doo–Sabin paper cited in the book is not primarily about Doo–Sabin surfaces. This paper has two paragraphs on them as an example of its main topic, which is the use of eigenanalysis and Fourier partitioning for the analysis of the regions around extraordinary points.
- The analysis of extraordinary points, which for me is the most essential issue that distinguishes subdivision surface analysis from subdivision curve analysis, is given very late and not in great detail. This aspect needs to be complemented by [PR], which focuses strongly on this issue.

Yes, these are small niggles. I have no hesitation in recommending this book as a reference for subdivision research groups and as a textbook for courses on subdivision in mathematics departments. For courses in computer science, graphics, and engineering departments I would still recommend [WW].

REFERENCES

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[WW] J. Warren and H. Weimer, *Subdivision Methods for Geometric Design—A Constructive Approach*, Academic Press, New York, 2002.

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