

Harmonic Analysis and Wavelets

Math 686, Spring 2025

Class Time: MWF 11-11:50a.m. in 260 Tykeson Hall
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- (1) **Background and goals.** In the third term of the harmonic analysis sequence we will cover topics related to wavelets and frames. This includes the construction of Strömberg, Meyer, and Daubechies wavelets, minimally supported frequency (MSF) wavelets, multiresolution analysis, frame wavelets, the Hardy H^p spaces, and characterization of function spaces by wavelet coefficients.
- (2) **Grading.** There will be a couple of homework assignments, where students will be asked to write solutions of problems of their choice. There will be no exams.
- (3) **Textbooks.** The main text that I will be using is a book by Wojtaszczyk [5]. The other useful references are books [1, 2, 3, 4]. However, I will not follow any particular book for a longer period of time.

REFERENCES

- [1] I. Daubechies, *Ten lectures on wavelets*, SIAM, Philadelphia, PA, 1992.
- [2] E. Hernández, G. Weiss, *A first course on wavelets*, CRC Press, 1996.
- [3] Y. Meyer, *Wavelets and operators*, Cambridge Univ. Press, 1992.
- [4] M. Pinsky, *Introduction to Fourier Analysis and Wavelets*, Brooks/Cole 2002.
- [5] P. Wojtaszczyk, *A Mathematical Introduction to Wavelets*, Cambridge Univ. Press, 1997.