ON WEAVING FRAMES IN HILBERT SPACES

DONGWEI LI, JING JIANG AND YUXIANG XU

Abstract. In this paper, we obtain some new properties of weaving frames and present some conditions under which a family of frames is woven in Hilbert spaces. Some characterizations of weaving frames in terms of operators are given. We also give a condition associated with synthesis operators of frames such that the sequence of frames is woven. Finally, for a family of woven frames, we show that they are stable under invertible operators and small perturbations.

REFERENCES

[1] PETER BALAZS, DOMINIK BAYER, AND ASGHAR RAHIMI, *Multipliers for continuous frames in Hilbert spaces*, Journal of Physics A: Mathematical and Theoretical, **45** (24): 244023, 2012.

[2] TRAVIS BEMROSE, PETER G. CASAZZA, KARLHEINZ GRÖCHENIG, MARK C. LAMMERS, AND RICHARD G. LYNCH, *Weaving frames*, Operator and Matrices, **10** (4): 1093–1116, 2016.

[3] PETER G. CASAZZA, DANIEL FREEMAN, AND RICHARD G. LYNCH, *Weaving Schauder frames*, Journal of Approximation Theory, **211**: 42–60, 2016.

[4] PETER G. CASAZZA AND JELENA KOVAČEVIĆ, *Equal-norm tight frames with erasures*, Advances in Computational Mathematics, **18** (2–4): 387–430, 2003.

[5] PETER G. CASAZZA AND RICHARD G. LYNCH, *Weaving properties of Hilbert space frames*, Sampling Theory and Applications (SampTA), 2015 International Conference on, pages 110–114, 2015.

[6] RAYMOND H. CHAN, SHERMAN D. RIEMENSCHNEIDER, LIXIN SHEN, AND ZUOWEI SHEN, *Tight frame: an efficient way for high-resolution image reconstruction*, Applied and Computational Harmonic Analysis, **17** (1): 91–115, 2004.

[7] OLE CHRISTENSEN et. al., *An introduction to frames and Riesz bases*, Boston: Birkhäuser, 2016.

[8] OLE CHRISTENSEN, HONG OH KIM, AND RAE YOUNG KIM, *Extensions of Bessel sequences to dual pairs of frames*, Applied and Computational Harmonic Analysis, **34** (2): 224–233, 2013.

[9] INGRID DAUBECHIES, ALEX GROSSMANN, AND YVES MEYER, *Painless nonorthogonal expansions*, Journal of Mathematical Physics, **27** (5): 1271–1283, 1986.

[10] RICHARD J. DUFFIN AND ALBERT C. SCHAEFFER, *A class of nonharmonic Fourier series*, Transactions of the American Mathematical Society, **72** (2): 341–366, 1952.

[11] YONINA C. ELDAR AND G. DAVID FORNEY, *Optimal tight frames and quantum measurement*, IEEE Transactions on Information Theory, **48** (3): 599–610, 2002.

[12] DEGUANG HAN AND DAVID R. LARSON, *Frames, bases and group representations*, vol. **697**, American Mathematical Soc., 2000.

[13] DEGUANG HAN, FUSHENG LV, AND WENCHANG SUN, *Recovery of signals from unordered partial frame coefficients*, Applied and Computational Harmonic Analysis, **44** (1): 38–58, 2018.

[14] DONGWEI LI, JINSONG LENG, AND MIAO HE, *Optimal Dual Frames for Probabilistic Erasures*, IEEE Access, **7**: 2774–2781, 2018.

[15] DONGWEI LI, JINSONG LENG, TINGZHU HUANG, AND QING GAO, *Frame expansions with probabilistic erasures*, Digital Signal Processing, **72**: 75–82, 2018.

[16] YUE M. LU AND MINH N. DO, *A theory for sampling signals from a union of subspaces*, IEEE transactions on signal processing, **56** (6): 2334–2345, 2008.

Operators and Matrices
www.ele-math.com
oam@ele-math.com