

## EXTENSION OF THE TRUNCATED BI-INDEXED WEIGHTED SHIFTS, RECURSIVENESS AND SUBNORMALITY

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**ABSTRACT.** We build a process in order to extend the truncated weighted shift, using techniques of the bi-indexed recursive sequences. We apply this process to solve the subnormality of 2-variable weighted shifts, whose associated moment sequence is a bi-indexed recursive sequence. Notably, we detail the case of the truncated 2-variable weighted shift  $T \equiv (T_1, T_2)$  of order  $(2, 2)$ .

### REFERENCES

1. N. I. Akhiezer, *The classical moment problem and some related questions in analysis*, Translated by N. Kemmer Hafner Publishing Co., New York 1965.
2. A. Aluthge, *On  $p$ -hyponormal operators for  $0 < p < 1$* , Integral Equations Operator Theory **13** (1990), no. 3, 307–315.
3. R. Ben Taher, W. Iraoui, and M. Rachidi *Approximation of some linear recursive sequences and applications*, J. Interdiscip. Math. **8** (2005), no. 1, 69–80.
4. R. Ben Taher and M. Rachidi, *Solving some generalized Vandermonde systems and inverse of their associate matrices via new approaches for the Binet formula*, Appl. Math. Comput. **290** (2016), 267–280.
5. R. Ben Taher and M. Rachidi, *Truncated moment problems in  $\mathbb{R}^2$  and recursiveness*, Oper. Matrices **11** (2017), no. 4, 953–968.
6. C. Berg, *Indeterminate moment problems and the theory of entire functions*, J. Comput. Appl. Math. **65** (1995), no. 1, 27–55.
7. C. Berg, *From discrete to absolutely continuous solutions of indeterminate moment problems*, Arab J. Math. Sci. **4** (1998), no. 2, 1–18.

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8. G. Cassier, *Problème des moments sur un compact de  $\mathbb{R}^n$  et représentation de polynômes à plusieurs variables*, J. Funct. Anal. **58** (1984), no. 3, 254–266.
9. R. Curto and L. Fialkow, *Flat extensions of positive moment matrices : Relations in analytique or conjugate terms*, Oper. Theory Adv. Appl. **104** (1998), 59–82.
10. R. Curto, S. H. Lee, and J. Yoon, *A new approach to the 2-variable subnormal completion problem*, J. Math. Anal. Appl. **370** (2010), no. 1, 270–283.
11. R. Curto and J. Yoon, *jointly hyponormal pairs of commuting subnormal operators need not be jointly subnormal*, Trans. Amer. Math. Soc. **358** (2006), no. 11, 5139–5159.
12. R. Curto and J. Yoon, *Disintegration-of-measure techniques for commuting multivariable weighted shifts*, Proc. Lond. Math. Soc.(3) **92** (2006), 321–402.

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