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Lawrence A Fialkow* (fialkowl@newpaltz.edu). *Solving multivariable truncated moment problems through positive extensions.* Preliminary report.

For a real n -dimensional multisequence of degree $2d$, $\beta \equiv \{\beta_i\}_{i \in \mathbb{Z}_+^n, |i| \leq 2d}$, we consider the existence of a positive measure μ on \mathbb{R}^n such that $\beta_i = \int x^i d\mu$ ($|i| \leq 2d$). One solution to the preceding Truncated Moment Problem concerns the functional $L_\beta : P_{2d} \rightarrow \mathbb{R}$ defined by $L_\beta(\sum_{|i| \leq 2d} a_i x^i) = \sum a_i \beta_i$. A result proved with R.E. Curto (2009) shows that β has a measure if and only if L_β admits a positive extension $\tilde{L} : P_{2d+2} \rightarrow \mathbb{R}$ (i.e., $\deg p \leq 2d+2$, $p|_{\mathbb{R}^n} \geq 0 \implies \tilde{L}(p) \geq 0$). We discuss recent work with J. Nie concerning a numerical test for positivity of the functional. Another approach to TMP concerns extensions of the moment matrix M_d associated to β . β has a measure if and only if there exist positive semidefinite extensions M_{d+1}, \dots, M_{d+k} such that $\text{rank } M_{d+k} = \text{rank } M_{d+k-1}$ (for some $k \geq 1$). We discuss recent work with R.E. Curto illustrating this approach. (Received June 1, 2011)