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Convergence properties of Mellin moments under sine-cosine PDF parametrizations

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Abstract: We investigate the numerical convergence of Mellin moments of parton distribution functions (PDFs) when the conventional constant prefactor is replaced by sine-cosine expansions. Moments are computed for gluons and quarks using two theoretical parameter sets and compared with results from the standard parametrization. Our analysis demonstrates that trigonometric structures not only preserve the expected decrease of moments with increasing index but also improve numerical stability in small-x dominated integrals.

Keywords: Mellin moments, Parton Distribution functions, Trigonometric Parametrization, Quantum Chromodynamics, Small-x

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