Orthogonal Polynomials and Recurrence Coefficients

Name	Notation	Polynomial	Weight Fn.	Interval	α_k	β_k
Legendre	l_m	$\left[(x^2-1)^m\right]^{(m)}$	1	$[-1,1]$	0	$\beta_0 = 2,$ $\beta_k = (4-k^{-2})^{-1}, k \geq 1$
Chebyshev 1^{st}	T_m	$\cos(m \arccos x)$	$(1-x^2)^{-\frac{1}{2}}$	$[-1,1]$	0	$\beta_0 = \pi,$ $\beta_1 = \frac{1}{2},$ $\beta_k = \frac{1}{4}, k \geq 2$
Chebyshev 2^{nd}	Q_m	$\frac{\sin[(m+1)\arccos x]}{\sqrt{1-x^2}}$	$(1-x^2)^{\frac{1}{2}}$	$[-1,1]$	0	$\beta_0 = \frac{\pi}{2},$ $\beta_k = \frac{1}{4}, k \geq 1$
Laguerre	L_m^a	$x^{-a}e^x\left(x^{m+a}e^{-x}\right)^{(m)}$	$x^a e^{-x},\ a > -1$	$[0,\infty)$	$2k+a+1$	$\beta_0 = \Gamma(1+a),$ $\beta_k = k(k+a), k \geq 1$
Hermite	H_m	$(-1)^m e^{x^2}\left(e^{-x^2}\right)^{(m)}$	e^{-x^2}	$(-\infty,\infty)$	0	$\beta_0 = \sqrt{\pi},$ $\beta_k = \frac{k}{2}, k \geq 1$