GAUSS-QUADRATURES FOR HALF RANGE (SET-1)

N	m_n	w_n
1	0.50000 00000	1.00000 00000
2	0.21132 48654	0.50000 00000
	0.78867 51346	0.50000 00000
3	0.11270 16654	0.27777 77778
	0.50000 00000	0.44444 44444
	0.88729 83346	0.27777 77778
4	0.06943 18442	0.17392 74226
	0.33000 94782	0.32607 25774
	0.66999 05218	0.32607 25774
	0.93056 81558	0.17392 74226
5	0.04691 00770	0.11846 34425
	0.23076 53449	0.23931 43352
	0.50000 00000	0.28444 44444
	0.76923 46551	0.23931 43352
	0.95308 99230	0.11846 34425
6	0.03376 52429	0.08566 22462
	0.16939 53068	0.18038 07865
	0.38069 04070	0.23395 69673
	0.61930 95930	0.23395 69673
	0.83060 46932	0.18038 07865
	0.96623 47571	0.08566 22462

Source: Abramowitz M, Stegun, IA. *Handbook of Mathematical Functions*. Dover Publications Inc. 1964.

Derivation of Gauss-Quadratures For the Half Range

($2N$-1) spatial moments in (0,1) are sought as

$$\int_0^1 m^k dm = \sum_{n=1}^{N} w_n m_n^k = \frac{1}{k+1}, \qquad \text{For} \quad k = 0,1,\ldots,(2N-1)$$

This system of non-linear equations which should be solve for are

$$\begin{bmatrix} 1 & 1 & \cdots & 1 \\ m_1 & m_2 & \cdots & m_N \\ \vdots & \vdots & \ddots & \vdots \\ m_1^{2N-1} & m_2^{2N-1} & \cdots & m_N^{2N-1} \end{bmatrix} \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_N \end{bmatrix} = \begin{bmatrix} 1 \\ 1/2 \\ \vdots \\ 1/(2N) \end{bmatrix}$$

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