1. QuadI
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comment QuadI is useful when integration of several functions of same limits at same time using same point rule is desired. The interval \((a,b)\) is divided into \(m\) equal subintervals for an \(n\)-point quadrature integration. \(p\) is the number of functions to be integrated. \(w_k\) and \(u_k\) are normalized weights and absissas respectively, where \(k=1,2,3,\ldots,n\). \(u_k\) must be in ascending order. \(P(B,j) = : (c)\) is a procedure which must be supplied by the programmer. It evaluates \((c)\) the function (as indicated by \(j\)) for \(B\). \(I_j\) is the result of integration for function \(j\).

procedure QuadI \((a,b,m,n,p,w_k,u_k,P(B,j) = : (c)) = : (I)\)
begin
QuadI:

\[
\begin{align*}
& h := (b-a)/m \\
& \text{for } j := 1(1)p \quad I_i := 0 \\
& \quad A := a-h/2 \\
& \quad \text{for } i := 1(1)m \\
& \quad L1 \begin{align*}
& \quad A := A + h \\
& \quad \text{for } k := 1(1)n \\
& \quad L2 \begin{align*}
& \quad B := A + (h/2) \times u_k \\
& \quad \text{for } j := 1(1)p \\
& \quad L3 \begin{align*}
& \quad P(B,j) = : (c) \\
& \quad I_j := I_j + w_k \times c \\
& \quad \text{end } L3 \\
& \quad \text{end } L2 \\
& \quad \text{end } L1 \\
& \quad \text{for } j := 1(1)p \\
& \quad I_j := (h/2) \times I_j \\
\end{align*}
\end{align*}
\end{align*}
\]

return
integer \((j,k,i)\)
end QuadI