Example 1

Calculate the integral

$$\int_\Omega x \; dxdy$$

where Ω is the polygon area with corners in $(x, y) = (2, 1)$, $(9, 2)$, $(10, 4)$ and $(6, 5)$.

Example 2

Given the nodal values $U_1 = u(2, 1)$, $U_2 = u(9, 2)$, $U_3 = u(10, 4)$ and $U_4 = u(6, 5)$. Give an approximation of the value $u(7, 2)$.

Example 3

$$-\frac{d}{dx}\left(k\,\frac{du}{dx}\right) = \; f \qquad \text{in } 2 < x < 4 \qquad \text{with } u(2) = 0 \text{ and } u'(4) = 0$$

Solve the problem with $k(x) = 1$ and $f(x) = 1$ using 2 quadratic finite elements with endpoints in $x = 2$, $x = 2.8$ and $x = 4$.

NC 2003-11-13