

Name and surnames:

- (3) Using the mesh file **meshTwoHolesQuad.m** (plate with two holes) we define a temperature for each node according to the function

$$f(x, y) = 0.01y^2e^{-0.05x}\sqrt{x^2 + y^2}. \quad (2)$$

- (a) Compute the **interpolated temperature** associated to point $p = (59.5, 12.2)$ and the quadrilateral it belongs. Which is the **relative error** when comparing the interpolated temperature and the one assigned by the function?

numQuad	T(p)	RelError
339	4.71993e+00	2.27812e-02

(Hint: For node 35 the temperature value given by formula (2) is 8.18520e-01).

- (b) If we assign to each quadrilateral Q_i a **temperature** T_i , corresponding to the interpolated temperature at the barycenter, and an **area** A_i , computed as the sum of the two triangle areas formed by the corresponding nodes: $Tr_1 = [v_1, v_2, v_3]$, $Tr_2 = [v_1, v_3, v_4]$ then the area $A_i = A(Tr_1) + A(Tr_2)$.

Then compute the maximum value for A_i and T_i and the averaged temperature of the whole domain from the formula $T_{av} = \frac{1}{\sum A_i} \sum_i A_i T_i$.

$\max(A_i) =$	2.77685e+01
$\max(T_i) =$	8.55193e+01
$T_{av} =$	1.11414e+01

(Hint: For element 37 the assigned area and temperature values are 7.51859e+00 and 1.93225e+00 respectively.)

(2 points)