



REPÚBLICA DE CHILE
MUNICIPALIDAD DE SIERRA GORDA
REGIÓN DE ANTOFAGASTA

Baquedano, 21 de enero de 2025

SOLICITUD DE CONSTANCIA

Diego Sierra Cortes, Inspector de Obras Municipales, de la Ilustre Municipalidad de Sierra Gorda, deja constancia que la empresa CELPA SPA, RUT: 76.789.006-0, según contratos realizados ejecuto las siguientes obras:

1.- Mejoramiento Plaza el Bosque, Localidad de Baquedano, ID 3847-38-LQ24.

- Monto del proyecto: \$ 179.991.385.- IVA Incluido.
- Áreas intervenidas 1139 M²

El proyecto no contempla metros cuadrados construido, no obstante, tiene áreas que se intervinieron.

Se extiende el presente documento a solicitud de la empresa CELPA SPA, RUT: 76.789.006-0, para los fines que estime conveniente.



DIEGO SIERRA CORTES
INSPECTOR TÉCNICO DE OBRA
MUNICIPALIDAD SIERRA GORDA



and $\theta = \pi/2$, $\omega = 1$, $\rho = 1$, $\mu = 0.001$, $\nu = 0.001$, $\alpha = 0.001$, $\beta = 0.001$

Fig. 1. Velocity field U^x at $t = 0.001$ for $\theta = \pi/2$, $\omega = 1$, $\rho = 1$, $\mu = 0.001$, $\nu = 0.001$, $\alpha = 0.001$, $\beta = 0.001$.

$$\frac{\partial U^x}{\partial t} + U^x \frac{\partial U^x}{\partial x} + U^y \frac{\partial U^x}{\partial y} = -\frac{1}{\rho} \frac{\partial P}{\partial x} + \nu \frac{\partial^2 U^x}{\partial x^2} + \nu \frac{\partial^2 U^x}{\partial y^2}$$

where U^x and U^y are the horizontal and vertical components of the velocity field, P is the pressure, ρ is the density, ν is the kinematic viscosity, α and β are the thermal diffusivities of the fluid and the solid, respectively, and θ is the angle between the horizontal axis and the direction of the flow.

The boundary conditions are $U^x = 0$ and $U^y = 0$ at the bottom boundary, $y = 0$, and $U^x = 0$ at the top boundary, $y = 1$.

$$\begin{aligned} \frac{\partial U^x}{\partial y} &= 0 \quad \text{at } y = 0 \\ \frac{\partial U^y}{\partial y} &= 0 \quad \text{at } y = 1 \end{aligned}$$

The initial condition is $U^x = 0$ and $U^y = 0$ at $t = 0$. The boundary condition at the left boundary, $x = 0$, is $U^x = 0$ and $U^y = 0$ for $y \in [0, 1]$.

The problem is solved numerically using a finite difference scheme. The spatial derivatives are approximated by central differences, and the time derivative is approximated by a forward difference. The resulting system of equations is solved using an implicit finite difference scheme.

3. Numerical results

3.1. Velocity field

The velocity field U^x at $t = 0.001$ for $\theta = \pi/2$, $\omega = 1$, $\rho = 1$, $\mu = 0.001$, $\nu = 0.001$, $\alpha = 0.001$, $\beta = 0.001$ is shown in Fig. 1.

The velocity field shows a strong flow towards the right, with a maximum velocity of approximately 0.001.

The velocity field is zero at the bottom boundary, $y = 0$, and at the top boundary, $y = 1$.

The velocity field is zero at the left boundary, $x = 0$, for $y \in [0, 1]$.

The velocity field is zero at the right boundary, $x = 1$, for $y \in [0, 1]$.

The velocity field is zero at the bottom boundary, $y = 0$, and at the top boundary, $y = 1$.

The velocity field is zero at the left boundary, $x = 0$, for $y \in [0, 1]$.

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