Continuum Mechanics II Project Report
3D Panel Method

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Abstract

1 Introduction

2 Literature Review

3 Methodology

3.1 Geometry

The calculation of panel surface is done by module of cross product of panel diagonals with following expression :

$$S = \frac{|\mathbf{A} \times \mathbf{B}|}{2} \tag{1}$$

where S is surface, $\mathbf{A}$ and $\mathbf{B}$ panel diagonals
Calculation of collocation point $\mathbf{c}$ is done by mean value of the panel coordinates :

$$c_x = \frac{x_1 + x_2 + x_3 + x_4}{4}, c_y = \frac{y_1 + y_2 + y_3 + y_4}{4}, c_z = \frac{z_1 + z_2 + z_3 + z_4}{4} \tag{2}$$

where,c_x, c_y, c_z are coordinates of collocation point of the panel and x_i, y_i, z_i are coordinates of panel vertices

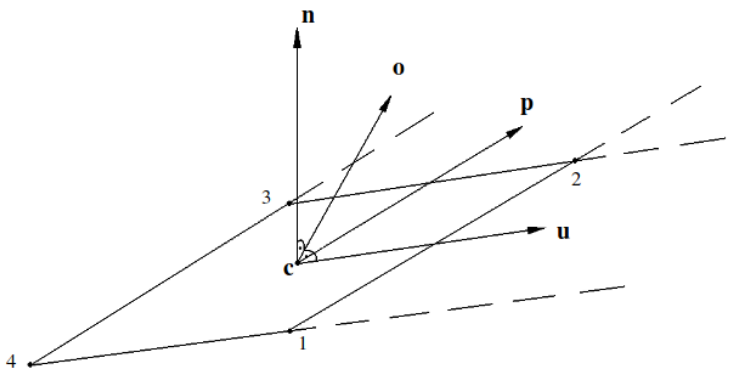

Figure 1: Collocation point $\mathbf{c}$ and unit vectors of panel

Calculation of unit vectors in longitudinal **u** and transverse **p** direction is performed by :

$$u_x = \frac{x_1 + x_2 - x_3 - x_4}{2}, u_y = \frac{y_1 + y_2 - y_3 - y_4}{2}, u_z = \frac{z_1 + z_2 - z_3 - z_4}{2} \tag{3}$$

$$p_x = \frac{x_2 + x_3 - x_1 - x_4}{2}, p_y = \frac{y_2 + y_3 - y_1 - y_4}{2}, p_z = \frac{z_2 + z_3 - z_1 - z_4}{2} \tag{4}$$

4 Result and Discussion

4.1 Result

4.2 Discussion

5 Conclusions

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6 References

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7 Numerical Code

Listing: