

Abstract Submitted  
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**The convergency at numerical solution of two primitive and non-primitive Pressure-Poisson Equations in an irregular domain using the collocated grid.**<sup>1</sup> ALI PASHAEI, NASSER FATOURAEI — Numerical discretization of Pressure-Poisson Equation (PPE), together with the boundary condition must satisfy the compatibility and incompressibility conditions and minimize the leading errors of approximations to discretization. Especially when a collocated arrangement for pressure and velocity is considered, satisfying these constraints is more difficult. Here the solution of PPE at irregular domain using a collocated grid is considered. Two primitive and non-primitive formulation of PPE are considered. In non-primitive PPE the total pressure term appears which includes the dynamic pressure and therefore the type of source term differs from the primitive formulation. Therefore some specialties are expected in these two forms. In practice we found the primitive formulation accurate and with instability of convergency at low iteration numbers, when the non-primitive PPE provides a fast convergence to the target. Here the proper discretization of both PPE in irregular domains is provided with collocated grids. Also a method of boundary and domain coding is suggested to facilitate applying boundary conditions on irregular domains. The convergency is evaluated using a test problem with a known pressure distribution. The results show the applicability and correct discretization approach provided with this study.

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