Incompressible CFD

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Mass conservation

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|  |  | (1) |

Momentum conservation

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|  |  | (2) |

where are velocity components, is density, is kinematic viscosity.

Split pressure terms from others

Characteristic-based convection stabilization.

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|  | Neglecting higher-order terms |

We need a way to compute the pressures. Find a way to compute pressures that makes n+1 satisfy continuity:

Expand

Substitute

|  |  |
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We can compute by solving this elliptic equation. Use the resulting values to compute . Then

# References

1. O. Zienkiewicz, R. L. Taylor, P. Nithiarasu. “The Finite Element Method for Fluid Dynamics.” Butterworth-Heinemann, Seventh Edition, 2013.