

## NON-CONFORMING MIMETIC AND VIRTUAL ELEMENT DISCRETIZATION FOR POLYHEDRAL MESHES

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We present a new family of schemes for solving elliptic partial differential equations in the primal form on unstructured polyhedral meshes. These discretizations can be interpreted as a mimetic finite difference method and a virtual element method. As mimetic methods, they are built to satisfy local consistency and stability conditions. The consistency condition, which ensures the well-posedness of the method, is an exactness property, i.e., all the schemes of the family are exact when the solution is a polynomial of an assigned degree. The degrees of freedom are the solution moments on mesh faces and inside mesh cells, thus resulting in a non-conforming discretization. Higher order schemes are built using higher order moments. The developed schemes are verified numerically on diffusion problems with constant and spatially variable (possibly, discontinuous) tensorial coefficients.

### REFERENCES

- [1] K. Lipnikov and G. Manzini, High-order mimetic methods for unstructured polyhedral meshes, Technical Report LA-UR-13-21177.