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Mixed finite element analysis for the Poisson-Nernst-Planck/Stokes coupling

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## Highlights:

- A stable mixed FEM is developed for Poisson-Nernst-Planck (PNP)/Stokes coupling.
- Optimal error estimates are obtained for all variables in  $H^1$  and  $L^2$  norms.
- The accuracy of the mixed FEM is higher than that of the standard FEM.
- Both Poisson equation and Stokes equations adopt the same Taylor-Hood element.
- The electric field achieves higher approximation accuracy than the standard FEM.

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