A stoichiometric method for reducing simulation cost of chemical kinetic models

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Highlights

- A model reduction method has been designed for reducing computational cost of chemical kinetic models.
- The method is applied to an acid generation/neutralization models, to reduce their degrees of freedom to one.
- Analytical and numerical methods have been used to study the associated reduction error.
- Analytical results show that the reduction error is zero at the ordinary differential equation level.
- Numerical results show that the method is compatible with numerical schemes and can accelerate convergence in some cases.
- CPU time shows that the method can significantly reduce simulation cost.