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A de novo implementation of the Anaerobic Digestion Model 1 raises questions about computational speed

The Anaerobic Digestion Model 1 is the quasi industry standard for modelling anaerobic digestion. It was conceived as a system of 35 ordinary differential equations (ODEs), but an alternate form was developed to reduce the stiffness of the system and therefore improve computation time. This alternate form is a system of differential algebraic equations (DAEs). The form of ADM1 (ODE vs DAE) is assumed to be the limiting factor when it comes to computation time. However, comparing a *de novo* ODE implementation written in Julia against existing DAE implementations in Python and Java shows that the Julia ODE implementation outperforms the DAE implementations. This result indicates that computational speed depends more on the numerical methods used to solve the system than the form of the system itself.