Structural analysis of the computational properties of QP-DAE systems

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Abstract

Many lumped dynamic models of process systems can be written without approximation in quasi-polynomial differential-algebraic equation (QP-DAE) form. We propose nonlinearity indices for QP-DAEs based on the system invariants. There are global (whole model) and local versions of the indices. The local ones are based on the implicit subsets (essential L-components) of the model. The indices are assessed against simulations of a vaporiser model with adjustable nonlinearity.

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