

*A matrix-oriented approach for the numerical solution of a  
metal corrosion model*

**Gianluca Frasca-Caccia** (University of Salerno, Department of  
Mathematics), Dajana Conte, Beatrice Paternoster

One of the main challenges in the numerical solution of corrosion models is the development of efficient numerical methods that can be used for predictive maintenance.

In this talk we consider a phase field model for metal pitting corrosion that allows for a simple and autonomous treatment of the moving interface. However, the equation that models the front evolution is highly stiff. The use of explicit time integrators after a standard space discretization is unpractical, due to strict stability requirements that force the use of tiny time steps.

Based on the Kronecker-sum structure of the discrete Laplacian obtained from standard finite difference approximations, we propose an efficient implementation of IMplicit-EXplicit (IMEX) time integrators.

Numerical tests are proposed to compare the proposed techniques with others from the literature.

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