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A study of meshless methods for optimization of cathodic protection systems. (English)
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Summary: Over the last decades, several computer codes have been developed aiming at the full 3D simulation of cathodic protection (CP) systems. CP is a technique applied to prevent corrosive processes and the main goal of the simulation has been to predict the degree of corrosion control achieved. Many pioneering works allowed for the successful application of the boundary element method (BEM) to CP systems. The aim of the present contribution is to introduce a brief overview of cathodic protection system modelling, including some numerical simulations. Mathematical formulations for the electrochemical potential problem are proposed, considering the following meshless methods: the method of fundamental solutions (MFS) and a meshless local Petrov-Galerkin (MLPG2) procedure. The meshless methods performances are evaluated comparing their results with a direct BEM solution procedure. The meshless applications are original first time attempts of such formulations to corrosion problems and cover a lot of practical situations found in actual cathodic protection applications.

MSC:

- 74 Mechanics of deformable solids
- 65 Numerical analysis

Keywords:

[BEM](#); [corrosion](#); [truly meshless methods](#)

Software:

[HYBRJ](#); [minpack](#)

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