

Diffusion processes in discontinuous media: numerical algorithms and benchmark tests

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We are interested in solving advection-diffusion problems using particle tracking techniques. Our presentation focus on problems with discontinuous coefficients. Typically, the particles may represent a plume of an inert solute evolving in the underground and the discontinuities may come from the heterogeneities of the porous medium. When the diffusion coefficient and the advective term are discontinuous, the commonly used Gaussian approximation to move the particles is no longer valid.

So far, several algorithms have been developped in the litterature for purely diffusive problems to deal with discontinuous diffusion coefficients, especially in the one dimensional case, e.g. [1–3]. We will present these algorithms. We will also analyze their ability to move the particles in the medium according to their true dynamics thanks to a set of benchmark test cases we have designed [4].

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