Abstract Submitted
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Anisotropic dispersion with a consistent smoothed particle hydrodynamics scheme[1] JAIME KLAPP, Instituto Nacional de Investigaciones Nucleares, CARLOS E ALVARADO-RODRIGUEZ, Universidad de Guanajuato, LEONARDO SIGALOTTI, Universidad Autonoma Metropolitana UAM-A, AYAX H TORRES-VICTORIA, SEPI ESIME UA Instituto Politecnico Nacional — A consistent smoothed particle hydrodynamics (SPH) approach is used to simulate the anisotropic dispersion of a solute in porous media. Consistency demands using large numbers of neighbors with increasing resolution. The method is tested against the anisotropic dispersion of a Gaussian contaminant plume. With irregularly distributed particles, the solution for isotropic dispersion converges to second-order accuracy when at sufficiently high resolution a large number of neighbors is used within the kernel support. For low to moderate anisotropy, the convergence rates are close to second-order, while for large anisotropic dispersion the solutions converge to better than first-order. For randomly distributed particles, the solutions are also better than first order independently of the degree of anisotropy. When negative concentrations arise, they are several orders of smaller magnitude than those encountered with standard SPH and comparable to those obtained with the MWSPH scheme of Avesani et al. The method is also insensitive to particle disorder and achieves an overall accuracy comparable to the MWSPH method using a much simpler approach.

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