

## Fractional Dynamics in Langevin and Fractional Fokker-Planck Equation

심병완\*, 정상용, 김경식†

부경대학교 해양과학대학 환경지질학과

†부경대학교 자연과학대학 물리학과

The Langevin equation with drift force fields is analytically investigated. For this case, we consider the fractional dynamics characterized by the force correlation function of decoupled spatio-temporal drift force fields and the fractional Fokker-Planck equation with an external harmonic potential. Specially, the statistical behavior of fractional dynamics is also compared with that of stationary Fokker-Planck equation.

In conclusions, from a fractional Fokker-Planck equation, the tracer dispersion for the anomalous transport process has been discussed in the presence of a temporal power-law dependence of the drift and an external harmonic potential. The first and second moments of the tracer can be analyzed the subdiffusive or superdiffusive behavior for several values of the exponent  $\beta$  in a temporal power-law dependence of drift. It is expected that the detail description of the anomalous behavior will be used to study the extension of the numerical stratified models and fractal lattice models.

---

E-mail : sychung@pknu.ac.kr, kskim@pknu.ac.kr