1147-35-355 **Goro Akagi*** (goro.akagi@tohoku.ac.jp), Sendai, Miyagi , Japan. *Fractional gradient flows in Hilbert spaces.*

Fractional notions of derivatives, e.g., Riemann-Liouville and Caputo derivatives, are recently attracting more attention in view of modeling for non-classical phenomena such as anomalous diffusion. Indeed, there have been much contribution to linear PDEs including fractional derivatives. On the other hand, nonlinear counterparts have not yet been fully pursued due to the lack of general theory for such nonlinear PDEs including fractional derivatives. This paper presents an abstract theory on well-posedness for time-fractional abstract evolution equations governed by subdifferential operators in Hilbert spaces. Our proof relies on a regularization argument as well as energy estimates based on the maximal monotonicity of time-fractional differential operators and a *nonlocal chain-rule formula* for subdifferentials. Moreover, it will be extended to a Lipschitz perturbation problem. These abstract results will be also applied to time-fractional nonlinear PDEs such as time-fractional porous medium, fast diffusion, p-Laplace parabolic and Allen-Cahn equations. (Received January 21, 2019)