

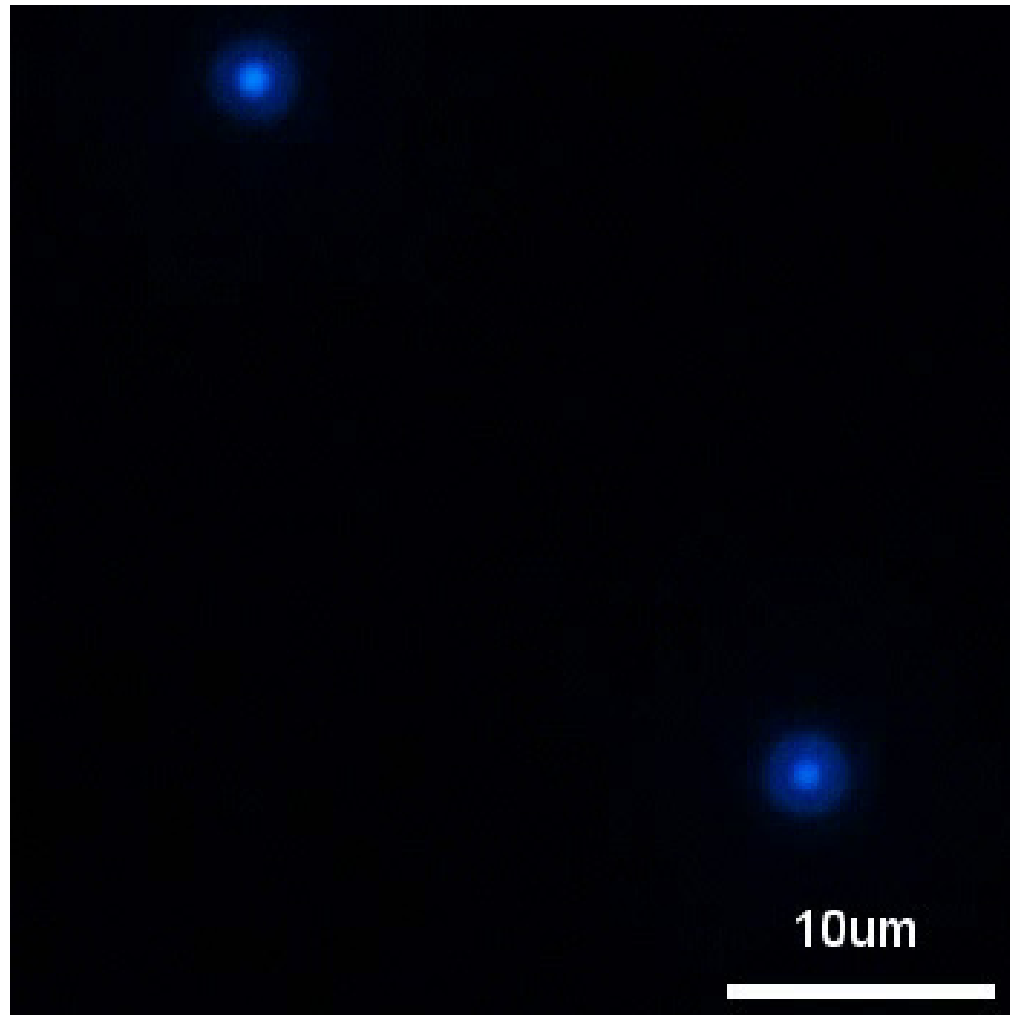
2018.11.7  
物性物理学C

# ランジュバン方程式

北 畑 裕 之

# ブラウン運動

ナノ粒子



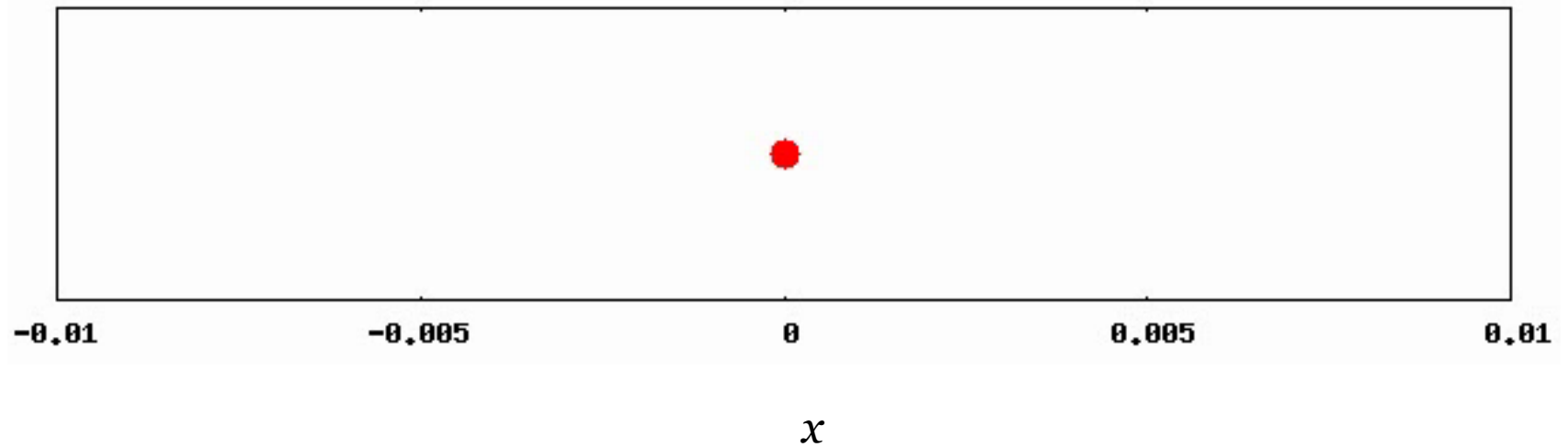
# Langevin方程式

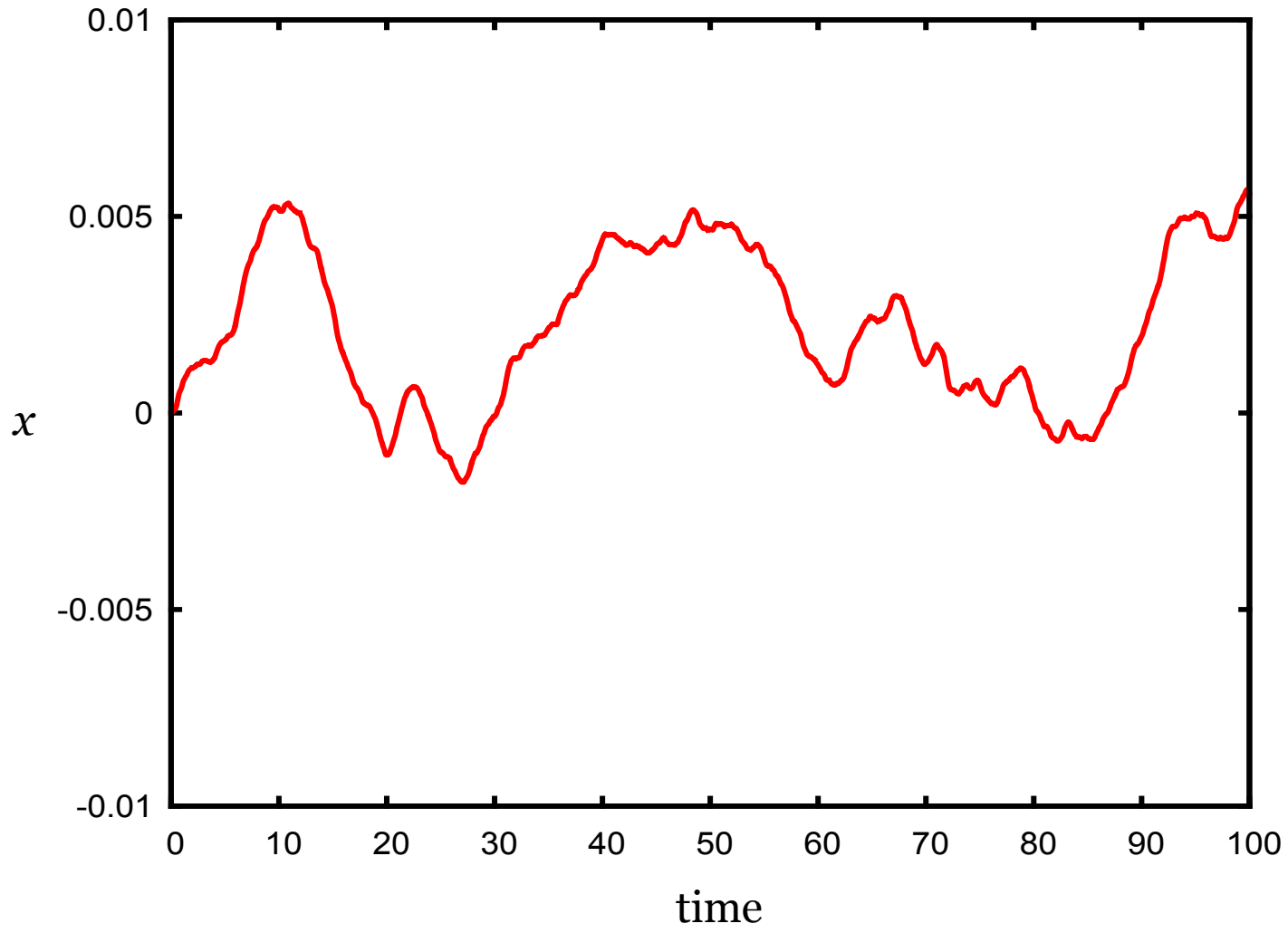
$$m \frac{d^2 \mathbf{r}}{dt^2} = -\gamma \frac{d\mathbf{r}}{dt} + \boldsymbol{\xi}(t)$$

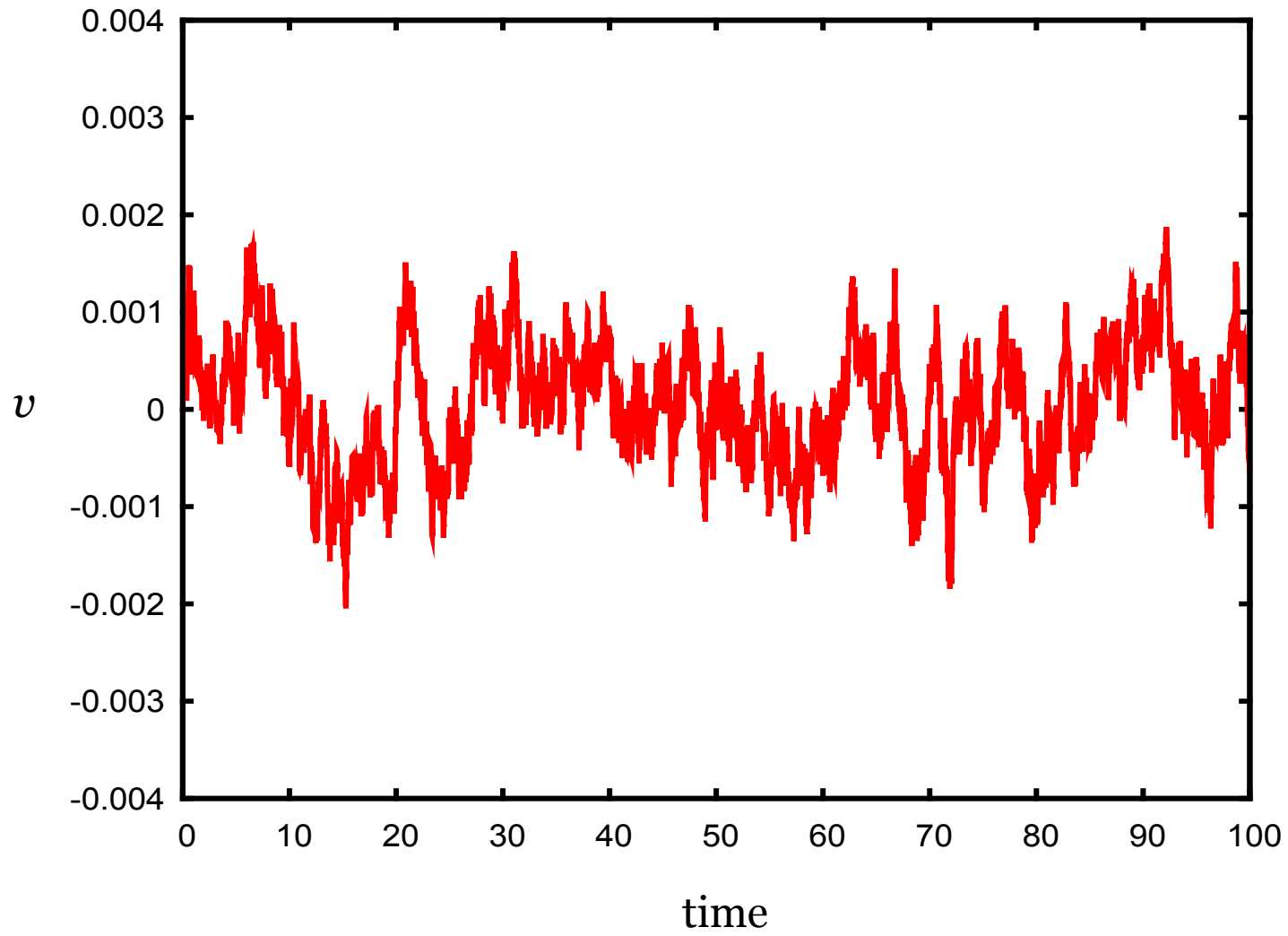
$$\langle \boldsymbol{\xi}(t) \rangle = 0$$

$$\langle \boldsymbol{\xi}(t) \cdot \boldsymbol{\xi}(s) \rangle = 2M\delta(t-s)$$

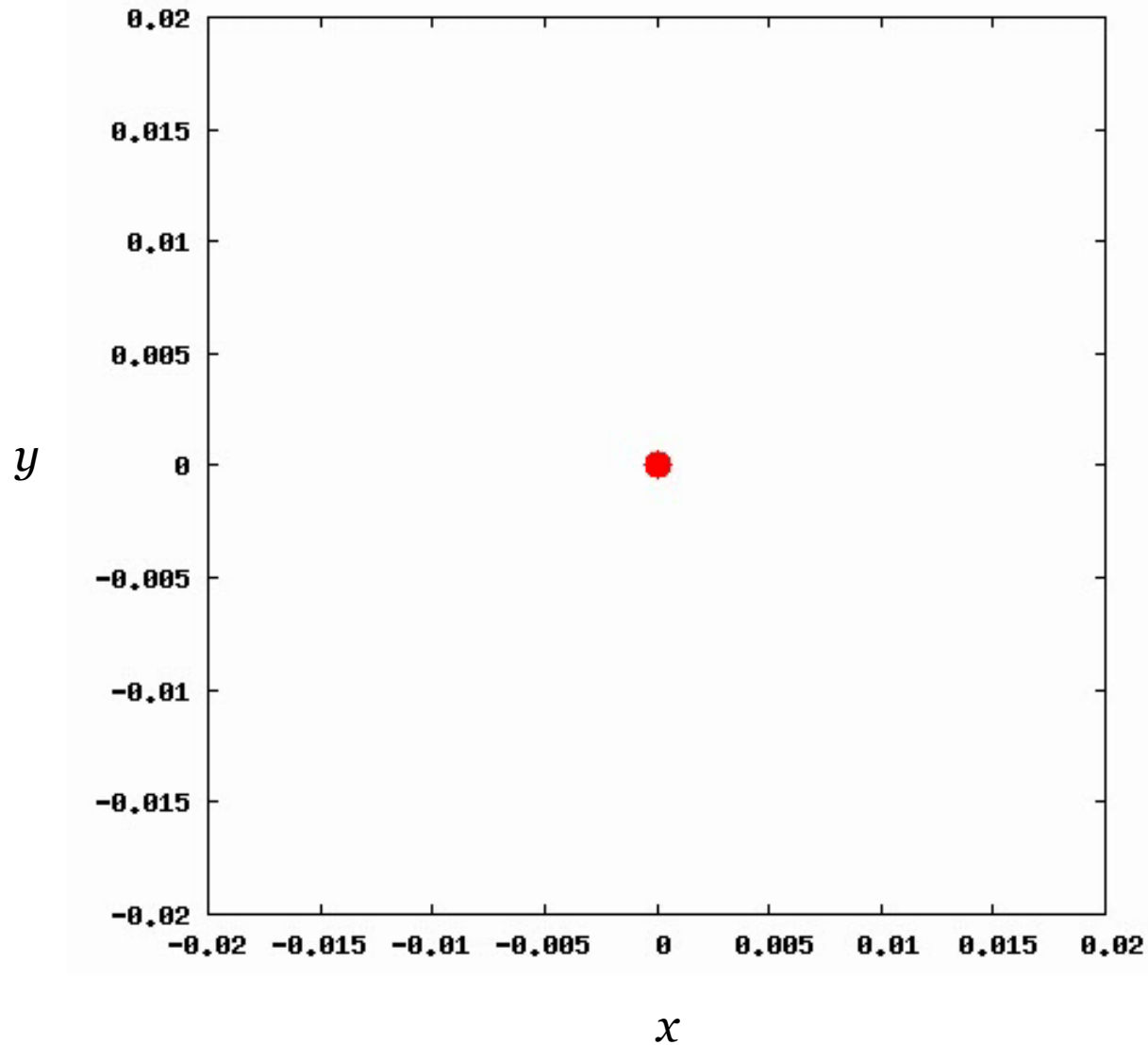
# 1次元系でのLangevin方程式による挙動







# 2次元での数値計算



軌跡を残すと

