

## Parameters

$$a > 0 \tag{1}$$

$$b > 0 \tag{2}$$

$$K \geq 0 \tag{3}$$

$$D_0 \geq 0 \tag{4}$$

$$\tau \geq 0 \tag{5}$$

## Potential

$$V(x) = \frac{a}{4}x^4 - \frac{b}{2}x^2 = \frac{a}{4}x^2 \left( x - \sqrt{\frac{2b}{a}} \right) \left( x + \sqrt{\frac{2b}{a}} \right) \tag{6}$$

## Force

$$F(x) = -\frac{\partial V}{\partial x} = -ax^3 + bx \tag{7}$$

We have 2 Hypervolumes

$$\mathcal{V}_t \subset \mathbb{R}^{n_t} \tag{8}$$

$$\mathcal{V}_\tau \subset \mathbb{R}^{n_\tau} \tag{9}$$

$$\mathcal{V} = \mathcal{V}_t \times \mathcal{V}_\tau \tag{10}$$

$$n_t \geq n_\tau \tag{11}$$

$$\dot{X}_t = F(X_t, X_\tau) \, \mathrm{d}t + \sqrt{2D_0} \, \mathrm{d}B_t \tag{12}$$

$$= -aX_t^3 \, \mathrm{d}t + bX_t \, \mathrm{d}t + K(X_t - X_\tau) \, \mathrm{d}t + \sqrt{2D_0} \, \mathrm{d}B_t \tag{13}$$

$$F(x, x_\tau) = F_1(x) + F_2(x_\tau) = -ax^3 + (b + K)x - Kx_\tau \tag{14}$$