

$$\varphi(r) = \exp\left(-\frac{r^2}{\varsigma_k^2}\right)$$

$$\dot{\varphi}(r) = -\frac{2}{\varsigma_k^2}r\varphi(r)$$

$$\frac{\dot{\varphi}(r)}{r} = -\frac{2}{\varsigma_k^2}\varphi(r)$$

$$\ddot{\varphi}(r) = -\frac{2}{\varsigma_k^2}\{\varphi(r) + r\dot{\varphi}(r)\}$$