

The Berendsen thermostat:  
Exponential decay

$$\frac{d\langle K \rangle(t)}{dt} = \frac{1}{\tau} [\langle K \rangle_{NVT} - \langle K \rangle(t)]$$

$$\frac{d\langle K \rangle(t)}{\langle K \rangle_{NVT} - \langle K \rangle(t)} = \frac{dt}{\tau}$$

$$\int \frac{1}{\langle K \rangle_{NVT} - \langle K \rangle(t)} d\langle K \rangle(t) = \frac{1}{\tau} \int dt$$

$$-\log [\langle K \rangle_{NVT} - \langle K \rangle(t)] = \frac{t}{\tau}$$

$$\langle K \rangle_{NVT} - \langle K \rangle(t) = e^{-\frac{t}{\tau}}$$

$$\langle K \rangle(t) = \langle K \rangle_{NVT} - e^{-\frac{t}{\tau}}$$