

Wärmeleitungsgleichung:

$$\frac{\partial T}{\partial t} = a \Delta T + \frac{\dot{q}_Q}{\rho c}$$

Laplace-Operator in kartesischen Koordinaten:

$$\Delta T = \frac{\partial^2 T}{\partial x^2} + \frac{\partial^2 T}{\partial y^2} + \frac{\partial^2 T}{\partial z^2}$$

Laplace-Operator in Zylinderkoordinaten:

$$\Delta T = \frac{1}{r} \frac{\partial}{\partial r} \left(r \frac{\partial T}{\partial r} \right) + \frac{1}{r^2} \frac{\partial^2 T}{\partial \varphi^2} + \frac{\partial^2 T}{\partial x^2}$$

Laplace-Operator in Kugelkoordinaten:

$$\Delta T = \frac{1}{r} \frac{\partial^2}{\partial r^2} (rT) + \frac{1}{r^2 \sin \theta} \frac{\partial}{\partial \theta} \left(\sin \theta \frac{\partial T}{\partial \theta} \right) + \frac{1}{r^2 \sin^2 \theta} \frac{\partial^2 T}{\partial \varphi^2}$$