

Laser Derivation vor Mixed

OpenFOAM?

Heat / Convection



Laser

$$T_f = \omega T_f^0 + (1-\omega) \left[T_c - \frac{\nabla_{\perp}^0 T}{\Delta} \right]$$

1. Convection

$$q_1 = \lambda \nabla T / \Delta \Rightarrow \frac{\lambda (T_f - T_c)}{\delta}$$

$$q_2 = \alpha \cdot \nabla T \Rightarrow \alpha \cdot (T_{\infty} - T_f)$$

$$\Rightarrow \frac{\lambda (T_f - T_c)}{\delta} = \alpha (T_{\infty} - T_f)$$

$\Rightarrow$ UMSTEHEN auf T_f

$$\frac{\lambda T_f}{\delta} - \frac{\lambda T_c}{\delta} = \alpha T_{\infty} - \alpha T_f$$

$$\frac{\lambda T_f}{\delta} + \alpha T_f = \alpha T_{\infty} + \frac{\lambda T_c}{\delta}$$

$$T_f \cdot \left(\frac{\lambda}{\delta} + \alpha \right) = \alpha T_{\infty} + \frac{\lambda T_c}{\delta}$$

$$T_f = \underbrace{\frac{\alpha}{\left(\frac{\lambda}{\delta} + \alpha \right)}}_{\omega} T_{\infty} + \underbrace{\frac{\frac{\lambda}{\delta}}{\left(\frac{\lambda}{\delta} + \alpha \right)}}_{(1-\omega)} T_c$$

$$T_f = \omega T_f^0 + (1-\omega) T_c - (1-\omega) \frac{\nabla_{\perp}^0 T}{\Delta}$$