

$$\frac{\partial T_{ijk}^{\max}}{\partial T_{ijk}^{\max}} = \frac{\Delta t}{\Delta x} \left[\max(0, \tilde{u}_i) \tilde{T}_{i-1} - \min(0, \tilde{u}_{i+1}) \tilde{T}_{i+1} \right] +$$

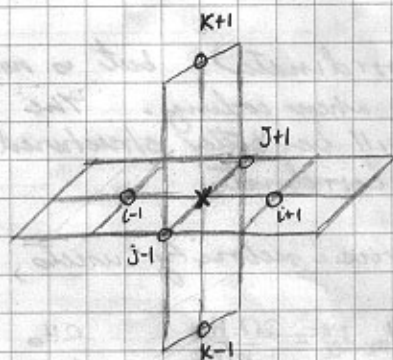
$$\frac{\Delta t}{\Delta y} \left[\max(0, \tilde{v}_j) \tilde{T}_{j-1} - \min(0, \tilde{v}_{j+1}) \tilde{T}_{j+1} \right] +$$

$$\frac{\Delta t}{\Delta z} \left[\max(0, \tilde{w}_{k-1}) \tilde{T}_{k-1} - \min(0, \tilde{w}_k) \tilde{T}_{k+1} \right]$$

$$\frac{\partial T_{ijk}^{\min}}{\partial T_{ijk}^{\min}} = \frac{\Delta t}{\Delta x} \left[\max(0, \tilde{u}_{i+1}) \tilde{T}_i - \min(0, \tilde{u}_i) \tilde{T}_{i+1} \right] +$$

$$\frac{\Delta t}{\Delta y} \left[\max(0, \tilde{v}_{j+1}) \tilde{T}_j - \min(0, \tilde{v}_j) \tilde{T}_{j+1} \right] +$$

$$\frac{\Delta t}{\Delta z} \left[\max(0, \tilde{w}_k) \tilde{T}_k - \min(0, \tilde{w}_{k-1}) \tilde{T}_{k+1} \right]$$



$$\begin{aligned} T_{ijk}^{\min} &= \min \\ T_{ijk}^{\max} &= \max \end{aligned} \left[\right.$$

$$\left. \begin{aligned} &\tilde{T}(i, j, k), T(i, j, k) \\ &\tilde{T}(i-1, j, k), T(i-1, j, k) \\ &\tilde{T}(i+1, j, k), T(i+1, j, k) \\ &\tilde{T}(i, j-1, k), T(i, j-1, k) \\ &\tilde{T}(i, j+1, k), T(i, j+1, k) \\ &\tilde{T}(i, j, k-1), T(i, j, k-1) \\ &\tilde{T}(i, j, k+1), T(i, j, k+1) \end{aligned} \right]$$

Smolarkiewicz nomenclature:

	$T(i, j+1)$	
	$v(i, j+1)$	
$T(i, j)$	$T(i, j)$	$T(i+1, j)$
	$u(i, j)$	$u(i+1, j)$
	$v(i, j)$	
	$T(i, j-1)$	

$$u_{I-1/2e} \Rightarrow u_i \quad v_{I-1/2e} \Rightarrow v_j \quad w_{I-1/2e} \Rightarrow w_k$$

$$u_{I+1/2e} \Rightarrow u_{i+1} \quad v_{I+1/2e} \Rightarrow v_{j+1} \quad w_{I+1/2e} \Rightarrow w_{k+1}$$

$$T_{I-e} \Rightarrow T_{i-1} \quad T_{I-e} \Rightarrow T_{j-1} \quad T_{I-e} \Rightarrow T_{k-1}$$

$$T_{I+e} \Rightarrow T_{i+1} \quad T_{I+e} \Rightarrow T_{j+1} \quad T_{I+e} \Rightarrow T_{k+1}$$

$$T_I \Rightarrow T_i \quad T_I \Rightarrow T_j \quad T_I \Rightarrow T_k$$