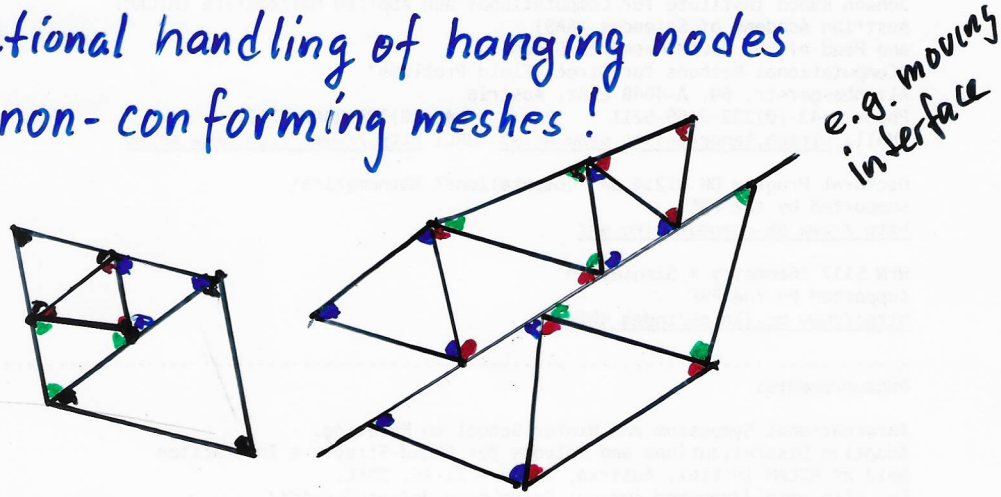
Remark 4.3: Pros & Cons

1. Pros:

⊕ Variational handling of hanging nodes and non-conforming meshes!



Adaptivity and treatment of moving interfaces (e.g. electric motor) is much easier!

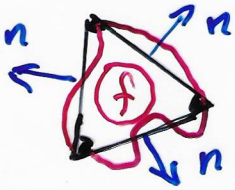
⊕ block (δ) diagonal mass matrices!
$\Rightarrow$ well suited for time-dependent problems!

⊕ natural upwinding for convection dominated problems!

⊕ conservative: test function $v_h(x) = \begin{cases} 1, & x \in \bar{\delta} \\ 0, & \text{otherwise} \end{cases} \in \bar{V}_h$

$$\Rightarrow \int_{\delta} f \, dx = - \int_{\partial\delta} \nabla u \cdot n \, ds$$

DG-FEM $\longleftrightarrow$ FVM



⊕ ...

2. Cons:

⊖ increasing number of global dofs!
How to overcome this drawback?
$\longrightarrow$ Domain Decomposition DG (Nitsche)
$\longrightarrow$ Hybridization

⊖ larger stencils and non-locality (δ) due to coupling blocks ($\partial\delta$)!

⊖ penalty parameters α_e, $e \in \bar{E}_h$!

⊖ ...