Remark 4.3: Pros & Cons

1. Pros:
   - Variational handling of hanging nodes and non-conforming meshes!
   - Block diagonal mass matrices!
   - Well suited for time-dependent problems!
   - Natural upwinding for convection dominated problems!
   - Conservative: test function $v_h(x) = \begin{cases} \mathbf{1}_{x \in \Omega} & \text{in } V_h \\ 0 & \text{otherwise} \end{cases}$

   \[ \int_{\gamma} f \, ds = - \int_{\partial \Omega} \mathbf{u} \cdot \mathbf{n} \, ds \]

   → DG-FEM ←→ FVM

2. Cons:
   - Increasing number of global dofs!
     How to overcome this drawback?
     → Domain Decomposition DG (Nitsche)
     → Hybridization
   - Larger stencils and non-locality (δ)
     due to coupling blocks (Ωd)
   - Penalty parameters $\alpha_e$, $e \in E_k$
   - ...