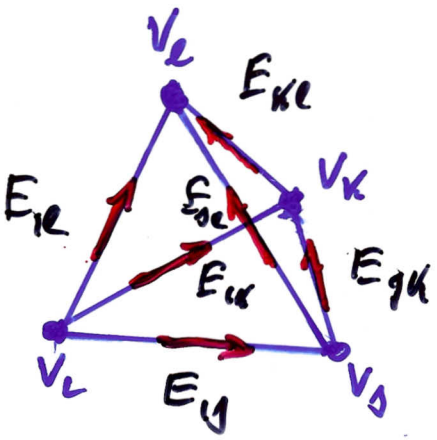
3.3. Tetrahedral Edge Elements

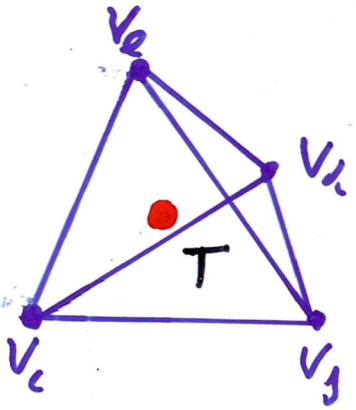
The de Rham sequence in 3D:

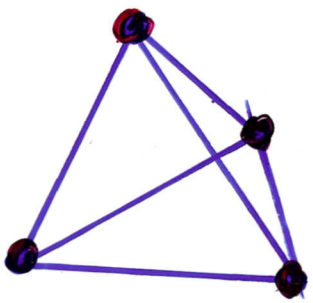
$$
\begin{array}{ccccccc}
H^1/\mathbb{R} & \xrightarrow{\nabla} & H(curl) & \xrightarrow{curl} & H(div) & \xrightarrow{div} & L_2 \\
\cup\downarrow I_h^V & & \cup\downarrow I_h^E & & \cup\downarrow I_h^F & & \cup\downarrow I_h^T \\
W_h/\mathbb{R} & \xrightarrow{\nabla} & V_h & \xrightarrow{curl} & R_h & \xrightarrow{div} & S_h \\
\uparrow \varphi_{V_i} & & \uparrow \psi_{E_{ij}} & & \uparrow \psi_{F_{ijk}} & & \uparrow \psi_T \\
\mathcal{L}_1/\mathbb{R} & \xrightarrow{\nabla} & \mathcal{N}_0 & \xrightarrow{curl} & \mathcal{RT}_0 & \xrightarrow{div} & S_0
\end{array}
$$

FE: $\mathcal{T}_h$, Ψ_T

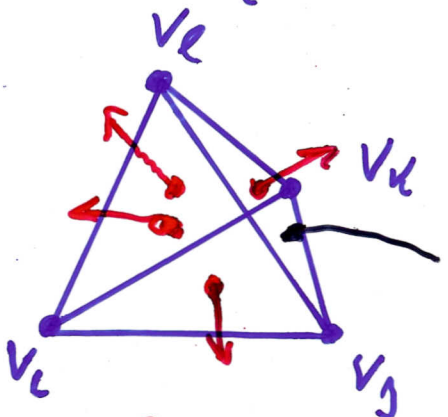


$\dim \mathcal{N}_0 = 6$





$\dim \mathcal{L}_1 = 4$



$\dim \mathcal{RT} = 4$

φ_{V_i} $\quad$ $\psi_{E_{ij}}$ $\quad$ $\psi_{F_{ijk}}$ $\quad$ ψ_T