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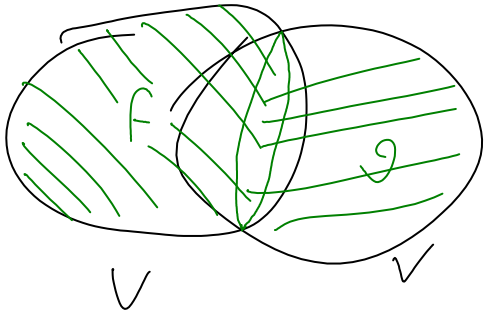
Claim $\Omega^p(U) \oplus \Omega^p(V) \xrightarrow{i_U^* + i_V^*} \Omega^p(U \cap V)$

is surjective.

Proof Find f, g with $f+g=1$ on $U \cup V$ and $\operatorname{supp} f \subset U$, $\operatorname{supp} g \subset V$. Given $w \in \Omega^p(U \cap V)$, consider

$$(gw, fw) \xrightarrow{i_U^* + i_V^*} (f+g)w|_{U\cap V} = w \text{ on } U \cap V$$

Claim gw extended by 0 to U is smooth.



Pf $g = 0$ on $U \setminus (\operatorname{supp} g \cap U)$ which is an open set containing $U \setminus (U \cap V)$.

So set

$$\widetilde{gw}(x) = \begin{cases} gw(x) & x \in U \cap V \\ 0 & x \in U \setminus (U \cap V) \end{cases}$$