Similarly. any element (ω, η) of $C^0(\{U, V\}, \Omega^1) = \{(\omega, \eta) \in \Omega^1(U) \times \Omega^1(V)\}$. may be written as

$$\omega = \left(\sum_{n=0}^{\infty} a_n u^n\right) du \quad , \quad \eta = \left(\sum_{n=0}^{\infty} b_n v^n\right) dv$$

$\Rightarrow$ On $U \cap V = \mathbb{C}^*$, $\quad \eta = \left(\sum_{n=0}^{\infty} b_n v^n\right) dv = \left(\sum_{n=0}^{\infty} b_n (u^{-1})^n\right) du^{-1}$

$$= \left(-\sum_{n=0}^{\infty} b_n u^{-n} u^{-2}\right) du = -\sum_{n=0}^{\infty} b_n u^{-(n+2)} du$$

$$\Rightarrow \quad \delta((\omega, \eta)) = 0 = -\omega + \eta \quad \Leftrightarrow \quad \sum_{n=0}^{\infty} a_n u^n = -\sum_{n=0}^{\infty} b_n u^{-(n+2)}$$

$$\Leftrightarrow \quad a_n = b_n = 0. \quad \Rightarrow \quad H^0(\mathbb{P}^1, \Omega^1) = H^0(\{U, V\}, \Omega^1) = 0$$

By the same token, $\nu = \left(\sum_{n=-\infty}^{\infty} a_n u^n\right) du \in C^1(\{U, V\}, \Omega^1)$
$\qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \quad \| \; \Omega^1(U \cap V)$

$$= \delta((\omega, \eta)) \quad \Longleftrightarrow \quad a_{-1} = 0$$

$$\omega = -\left(\sum_{n=0}^{\infty} a_n u^n\right) du \qquad \eta = -\left(\sum_{n=2}^{\infty} a_{-n} v^{n-2}\right) dv$$

if $n = 1$, $\; a_{-1} v^{-1}$ is not allowed.

$$\Rightarrow \delta((\omega, \eta)) = -\omega + \eta$$

$$= \left(\sum_{n=0}^{\infty} a_n u^n\right) du - \left(\sum_{n=1}^{\infty} a_n v^{n-2}\right) dv = \sum_{n=0}^{\infty} a_n u^n du + \sum_{n=1}^{\infty} a_{-n} u^{-n+2} u^{-2} du$$

$$= \sum_{n=0}^{\infty} a_n u^n du + \sum_{n=2}^{\infty} a_{-n} u^{-n} du = \sum_{n=-\infty}^{\infty} a_n u^n du.$$

$$a_{-1} \in \mathbb{C}. \quad \Rightarrow \quad H^1(\mathbb{P}^1, \Omega^1) = \mathbb{C}$$

In general, $\quad H^p(\mathbb{P}^n, \Omega^q) = \begin{cases} \mathbb{C}, & \text{if } p = q \leq n. \\ 0 & \text{otherwise} \end{cases}$

can be verified.
We will prove later by means of Hodge Theory.