$\eta + \gamma'' \wedge du_K/u_K$ has no essential singularity. 」

「" Comments on the statement that so the $v$'s may effectively be ignored.

$$(\Delta^*)^k \xhookrightarrow{\iota} (\Delta^*)^k \times \Delta^{n-k} \xrightarrow{p} (\Delta^*)^k$$

$$H^q_{DR}((\Delta^*)^k) \xrightarrow[\text{one to one}]{p^*} H^q_{DR}((\Delta^*)^k \times \Delta^{n-k}) \xrightarrow[\text{onto}]{\iota^*} H^q_{DR}((\Delta^*)^k)$$

for the ordinary $C^\infty$ de Rham cohomology and holph... Without using chain homotopy, the result proves the following:

Given $[\varphi] \in H^q_{DR}((\Delta^*)^k \times \Delta^{n-k})$, since we can find $\eta$ s.t $\varphi - d\eta \equiv 0 \ (du_1, \cdots du_K)$, so that $\varphi - d\eta$ is independent of $v_1, \cdots v_{n-k}$,
$\exists \ [\psi] \in H^q_{DR}((\Delta^*)^k)$ s.t $p^*([\psi]) = [\varphi - d\eta]$.
Thus we can conclude that $H^q_{DR}((\Delta^*)^k) = H^q_{DR}((\Delta^*)^k \times \Delta^{n-k})$ for the ordinary and holomorphic forms.

For example, consider $H^1_{DR}(\Delta^*)$.
$0 = [\varphi] \in H^1_{DR}(\Delta^*)$
$\Rightarrow \quad \varphi = f(u)\, du \quad , \quad f(u) = \sum_{\nu=-N}^{\infty} a_\nu u^\nu.$

$$\varphi = \sum_{\nu=-N}^{\infty} a_\nu u^\nu du = a_{-1}\frac{du}{u} + \sum_{\nu=-N}^{-2} a_\nu u^\nu du + \sum_{\nu=0}^{\infty} a_\nu u^\nu du = a_{-1}\frac{du}{u} + d\left(\sum_{\nu=-N}^{-2} \frac{a_\nu u^{\nu+1}}{\nu+1} + \sum_{\nu=0}^{\infty} \frac{a_\nu u^{\nu+1}}{\nu+1}\right)$$

Let $\eta = \sum_{\nu=-N}^{-2} \frac{a_\nu u^{\nu+1}}{\nu+1} + \sum_{\nu=0}^{\infty} \frac{a_\nu u^{\nu+1}}{\nu+1}$. $\Rightarrow$