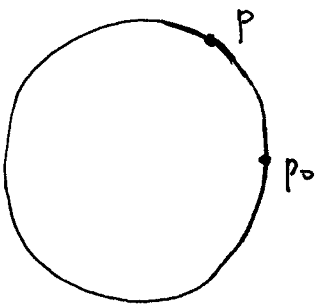
95. 2. 23

note page p588~590

$\omega = \frac{d\theta}{2\pi}$ one-form on S^1

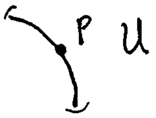


$\xrightarrow{f} \mathbb{R}/\mathbb{Z}$

$f(p) = \int_{p_0}^{p} \omega$ = the line integral over a curve joining p_0 and p.

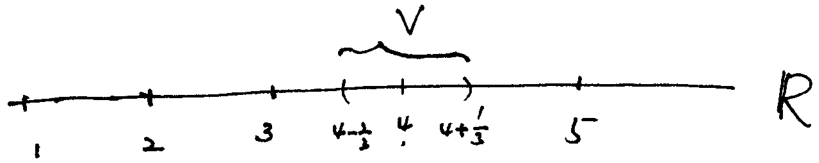
We want to show that f is differentiable.

To do this, for a connected small nbd U of p



$U \xrightarrow{f} V + \mathbb{Z}$

$V + \mathbb{Z} \underset{\varphi}{\cong} V$



$\Rightarrow \quad \varphi \circ f : U \longrightarrow \mathbb{R}$

$p' \longmapsto$

$\int_\alpha \omega + \int_{p_1}^{p} \omega$. $p_1 \in U$ fixed point

where α is a curve winding S^1 4 times

$\Rightarrow \quad \varphi \circ f(p') = \int_{p_1}^{p} \omega + 4 + C_0$. constant

$\int_{p_1}^{p} \omega$ is the line integral over any curve in U joining p_1 and p.