

Consider a map $\phi: V \longrightarrow E_x$ defined by

$\phi(\sigma) = \sigma(x)$. $\Rightarrow \phi$ is linear $\Rightarrow \ker \phi = \Lambda_x$
has the dimension $\dim V - \dim E_x = n - k$.

$$\begin{array}{ccc} \iota_v: M & \longrightarrow & G(n-k, V) \\ \downarrow \psi & & \downarrow \psi \\ x & \longmapsto & \Lambda_x \end{array}$$

We want to show that

$$\begin{array}{ccc} E & \xrightarrow{\tilde{\iota}_v} & Q \\ \downarrow & & \downarrow \\ M & \xrightarrow{\iota_v} & G(n-k, V) \end{array}$$

defined by $\tilde{\iota}_v(v) = \sigma + \Lambda_x$, where $\phi(\sigma) = v$,
isomorphic, on each fiber. Then we can conclude
that $\iota_v^* Q = E$, by p26. lemme 3.1 Milnor.
 $\text{rank } Q = k = \text{rank } E$. -- (*)

If $\tilde{\iota}_v(v) = 0$, $\sigma \in \Lambda_x$. $\Rightarrow \phi(\sigma) = v = 0$.

$\Rightarrow \tilde{\iota}_v$ is injective \Rightarrow By (*), $\tilde{\iota}_v$ is isomorphic.

Thus

$$\begin{array}{ccccccc} E & \xrightarrow{\tilde{\iota}_v} & Q & \longrightarrow & S^* \\ \downarrow & & \downarrow & & \downarrow \\ M & \xrightarrow{\iota_v} & G(n-k, V) & \xrightarrow{\cong} & G(k, V^*) \end{array}$$

$$\Rightarrow \iota_v^* S^* = E.$$

Given a section $\sigma: M \longrightarrow E$, define $\tau: G(n-k, V) \longrightarrow Q$ by $\tau(\Lambda) = \sigma + \Lambda$.

\Rightarrow The following diagram is commutative.