

I am confused.

I don't understand why $\overset{1}{\nabla}$ is different from $\overset{2}{\nabla}$.

I mean they have the same definition, don't they?

Your solution says the difference is in "the way we do parallel transport", but this confuses me. In both cases aren't we doing a parallel transport an infinitesimal direction in the \boldsymbol{w} direction?

In other words, why is

$$\overset{1}{\pi^a} (\xi, \boldsymbol{w})$$

different from

$$\overset{2}{\pi^a} (\xi, \boldsymbol{w})$$

?

Thanks