In the PEPS setting, the parameter index α naturally factorizes as

$$\alpha \equiv (\mathtt{x}, p, lrdu)$$

where $\mathtt{x}$ is the site index, p is the physical index and $lrdu$ are the virtual indices.

There is a fact:

$$O[\mathtt{x}](s)_{p,lrdu} = 0 \text{ if } p \neq s(\mathtt{x})$$

One thus only keeps non-zero elements in Jacobians $o[\mathtt{x}](s)_{lrdu} = O[\mathtt{x}](s)_{s(\mathtt{x}),lrdu}$ to improve minSR:

$$\begin{aligned}
\sum_\alpha O_{s\alpha} O^\dagger_{\alpha s'} &= \sum_{\mathtt{x}} \sum_p \sum_{lrdu} O[\mathtt{x}](s)_{p,lrdu} O^\dagger[\mathtt{x}](s')_{p,lrdu} \\
&\overset{\text{Fact}}{=} \sum_{\mathtt{x}} \sum_p \sum_{lrdu} O[\mathtt{x}](s)_{p,lrdu} O^\dagger[\mathtt{x}](s')_{p,lrdu} \mathbf{1}[p = s(\mathtt{x})] \mathbf{1}[p = s'(\mathtt{x})] \\
&= \sum_{\mathtt{x}} \sum_p \sum_{lrdu} \underbrace{O[\mathtt{x}](s)_{s(\mathtt{x}),lrdu}}_{o[\mathtt{x}](s)_{lrdu}} \underbrace{O^\dagger[\mathtt{x}](s')_{s'(\mathtt{x}),lrdu}}_{o^\dagger[\mathtt{x}](s')_{lrdu}} \mathbf{1}[p = s(\mathtt{x})] \mathbf{1}[p = s'(\mathtt{x})] \\
&= \sum_p \sum_{\mathtt{x}} \sum_{lrdu} \underbrace{o[\mathtt{x}](s)_{lrdu} \mathbf{1}[p = s(\mathtt{x})]}_{\tilde{o}} \underbrace{o^\dagger[\mathtt{x}](s')_{lrdu} \mathbf{1}[p = s'(\mathtt{x})]}_{\tilde{o}^\dagger}
\end{aligned}$$

which is exactly the small-o trick in minSR, with a mere difference that one has no need to store a $N_s \times N_p$ sample tensor. But maybe in practice one still calculates a $N_s \times N_p$ sample tensor for better GEMM.

For the small-o trick, one enumerates over p. One can also consider other enumeration orders.