

Let's denote by  $\mathbf{x}$  the original vector in the correct order, and by  $\mathbf{y} = \Pi\mathbf{x}$  the permutation of  $\mathbf{x}$  such that the indices corresponding to active constraints are at the bottom. For example:

$$\mathbf{y} = \begin{bmatrix} y_1 \\ y_2 \\ y_3 \\ y_4 \end{bmatrix} = \begin{bmatrix} x_2 \\ x_3 \\ x_1 \\ x_4 \end{bmatrix} = \Pi\mathbf{x}$$

with the permutation matrix

$$\Pi = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

Then, you can either rearrange the indices of  $\mathbf{x}$ , compute the product, and rearrange again, like this:

$$\Pi^T \left( \begin{bmatrix} \bar{D}_{11} & \bar{D}_{12} & 0 & 0 \\ \bar{D}_{21} & \bar{D}_{22} & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} (\Pi\mathbf{x}) \right)$$

Or, you can permute the scaling matrix first, and leave  $\mathbf{x}$  in the original order:

$$\left( \Pi^T \begin{bmatrix} \bar{D}_{11} & \bar{D}_{12} & 0 & 0 \\ \bar{D}_{21} & \bar{D}_{22} & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \Pi \right) \mathbf{x} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & \bar{D}_{11} & \bar{D}_{12} & 0 \\ 0 & \bar{D}_{21} & \bar{D}_{22} & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \mathbf{x}$$

In Matlab, you can construct the permuted scaling matrix by plugging in the elements of  $\bar{\mathbf{D}}$  (i.e., in our case - the inverse of the part of the Hessian that corresponds to inactive constraints) in the correct places, without constructing the permutation matrix.