

$$\begin{aligned}
& \overset{J}{v}^T \overset{v}{\dot{F}}^J(x) = \dot{y}\dot{y} = P\Phi'_l(V_l) \cdot \Phi'_{l-1}(V_{l-1}) \dots \Phi'_1(V_1) \cdot Q \cdot \dot{x} \\
& \dot{x} = \bar{y}^T \underset{i-n=x}{P\Phi'_l(V_l) \dots \Phi'_1(V_1)} \cdot Q \\
& \qquad \qquad \qquad \overset{i=\varphi_i(v_j)}{\underset{m-i}{\bar{v}}} = \underset{j \prec i}{\bar{v}_{l-i}} \\
& \bar{v}^T \Phi'(\dots) \bar{v}_j = \sum_{i \succ j} \bar{v}_j
\end{aligned}$$