$$\mathbf{x}_{i}\tilde{\mathbf{v}}_{i} m_{i} \omega_{\mathbf{X}}(\mathbf{x}_{i}) \\ \S \S \\ \rho(\mathbf{x}_{i}) \mathbf{v}(\mathbf{x}_{i}) ? \mathbf{v}(\mathbf{x}_{i}) \tilde{\mathbf{v}}_{i} \rho(\mathbf{x}_{i})$$

 $\lambda il_i nmm E E_d E_s$

$$E_d d_i(l_i) d_i(l_i) \bar{\mathbf{v}}(\mathbf{x}) \hat{\mathbf{v}}(l_i)$$

$$E_s V_{ij}(l_i, l_j) i = (p, q) j = (s, t) |p - s| + |q - t| = 1 \mathcal{N}$$

$$V(|l_i, l_j|)V(\Delta l)\omega_{ij}ij\rho_{min}\rho_{max}V(|l_i, l_j|)$$
§

$$\mathop{\rho_{max}}\limits_{i\rho_{max}} i\rho_{max}$$

 $\begin{array}{c} \Delta_{max} \\ inter_q rid_c onstraints Sample illustration. \\ \ref{eq:constraints} \\ group_c ollision Sample illustration. \end{array}$