$$Case\,1 : when\, u, v \in \mathcal{P}_k : \mathcal{P}(u, v \in S) = \mathcal{P}(\mathcal{P}_h\, is\, selected) = \frac{h}{H} \qquad Case\,2 : when\, u \in \mathcal{P}_k, v \in \mathcal{P}_j : \qquad \mathcal{P}(u, v) = \mathcal{P}(\mathcal{P}_{\|}\, \rangle \int\, \int \rceil$$