
Algorithm 1 Position-based dynamics

```
1: for all vertices  $i$  do
2:   initialize  $\mathbf{x}_i = \mathbf{x}_i^0$ ,  $\mathbf{v}_i = \mathbf{v}_i^0$ ,  $w_i = 1/m_i$ 
3: end for
4: loop
5:   for all vertices  $i$  do  $\mathbf{v}_i \leftarrow \mathbf{v}_i + \Delta t w_i \mathbf{f}_{\text{ext}}(\mathbf{x}_i)$ 
6:   for all vertices  $i$  do  $\mathbf{p}_i \leftarrow \mathbf{x}_i + \Delta t \mathbf{v}_i$ 
7:   for all vertices  $i$  do genCollConstraints( $\mathbf{x}_i \rightarrow \mathbf{p}_i$ )
8:   loop solverIteration times
9:     projectConstraints( $C_1, \dots, C_{M+M_{\text{Coll}}}, \mathbf{p}_1, \dots, \mathbf{p}_N$ )
10:  end loop
11:  for all vertices  $i$  do
12:     $\mathbf{v}_i \leftarrow (\mathbf{p}_i - \mathbf{x}_i) / \Delta t$ 
13:     $\mathbf{x}_i \leftarrow \mathbf{p}_i$ 
14:  end for
15:  velocityUpdate( $\mathbf{v}_1, \dots, \mathbf{v}_N$ )
16: end loop
```
