
Algorithm 2 Update $\vec{B}(s, d_s)$ after edge (u, v) is inserted

```
1: procedure INSERTEDGEINTOBALL( $u, v, \vec{\beta}_s$ )
2:    $Q \leftarrow$  An empty FIFO queue.
3:   if  $\vec{\beta}_s[v] > \vec{\beta}_s[u] + 1$  then
4:      $\vec{\beta}_s[v] \leftarrow \vec{\beta}_s[u] + 1$ ;  $Q.\text{push}(v)$ .
5:   while not  $Q.\text{empty}()$  do
6:      $v \leftarrow Q.\text{pop}()$ .
7:     if  $\vec{\beta}_s[v] = d_s$  then continue.
8:     for each  $(v, c) \in E$  do
9:       if  $\vec{\beta}_s[c] > \vec{\beta}_s[v] + 1$  then
10:         $\vec{\beta}_s[c] \leftarrow \vec{\beta}_s[v] + 1$ ;  $Q.\text{push}(c)$ .
```
