

---

**Algorithm 4.** Edge-Update( $G = (V, E), \mathbf{w}'(u, v)$ )

---

**Input:** updated edge with  $\mathbf{w}'(u, v)$ ,  $d(s, t)$  and  $\sigma_{st}$ ,  $\forall s, t \in V$ ; DAG( $s$ ),  $\forall s \in V$ .

**Output:** BC'( $v$ ),  $\forall v \in V$ ;  $d'(s, t)$  and  $\sigma'_{st}$   $\forall s, t \in V$ ; DAG'( $s$ ),  $\forall s \in V$ .

1: **for** every  $v \in V$  **do** BC'( $v$ )  $\leftarrow 0$ .

**for** every  $s, t \in V$  **do** compute  $d'(s, t), \sigma'_{st}, flag(s, t)$ .      // use Lemma 2

2: **for** every  $s \in V$  **do**

3:     Update-DAG( $s, (u, v)$ ).      // use Alg. 3

4:     Stack  $S \leftarrow$  vertices in  $V$  in a reverse topological order in DAG'( $s$ ).

5:     Accumulate-dependency( $s, S$ ).      // use Alg. 2

---