**Mahr algorithm**

input: $A$-weighted graph $G = (V, E, \lambda)$ for a complete semiring $\underline{A}$

output: matrix $D = (d_{u,v} \mid 1 \leq u, v \leq |V|)$

var: $C_G^{(0)}, \ldots, C_G^{(|V|)}$ : $|V| \times |V|$-matrices over $A$;

**begin**

$\quad C_G^{(0)} := M_G;$

$\quad$ **for** $k := 1$ **to** $|V|$ **do**

$\quad\quad$ **for** $u, v \in V$ **do**

$\quad\quad\quad [C_G^{(k)}]_{u,v} := [C_G^{(k-1)}]_{u,v} \oplus [C_G^{(k-1)}]_{u,k} \odot ([C_G^{(k-1)}]_{k,k})^* \odot [C_G^{(k-1)}]_{k,v};$

$\quad D := C_G^{(|V|)} \oplus_M 1_M$

**end**

where $M_G = (m_{u,v} \,|\, 1 \leq u, v \leq |V|)$ with

$$m_{u,v} = \begin{cases} \lambda(u, v) & \text{if } (u, v) \in E \\ 0 & \text{otherwise.} \end{cases}$$