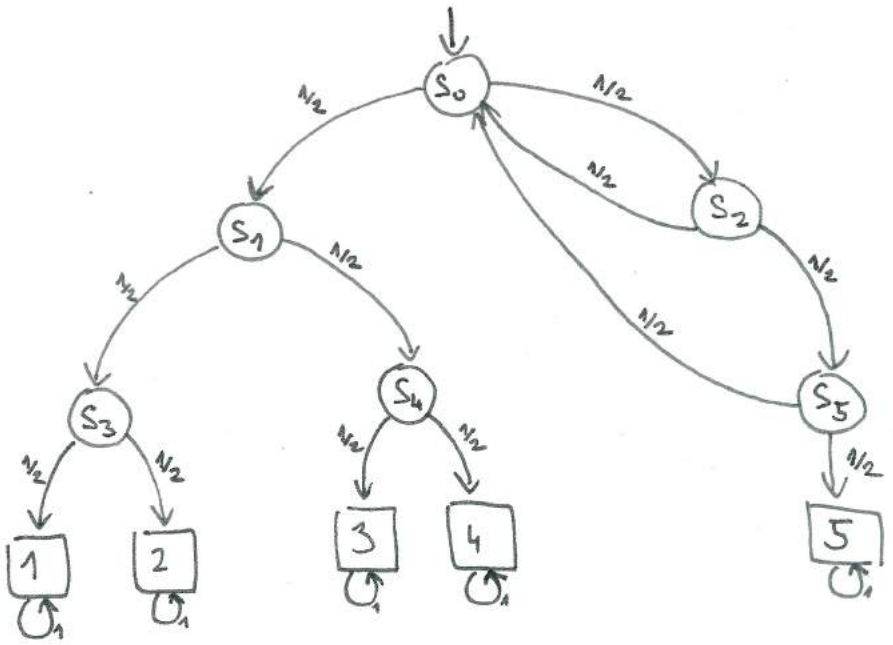


1) $P[S_0 \to 5] = \frac{1}{5}$? $\quad T = \{5\}$ $\quad S_0 = \{S_1, S_3, S_4, 1, 2, 3, 4\}$

$r(5) = 1$ $\quad r(S_1) = 0$

$r(S_5) = \frac{1}{2} r(5) + \frac{1}{2} r(S_0)$

$r(S_2) = \frac{1}{2} r(S_5) + \frac{1}{2} r(S_0)$

$r(S_0) = \frac{1}{2} r(S_2) + \frac{1}{2} r(S_1)$

from this system, we get

$r(S_0) = \frac{1}{5}$, $r(S_2) = \frac{2}{5}$, $r(S_5) = \frac{3}{5}$

↳ so $P[S_0 \to 5] = \frac{1}{5}$ ✓

$P[S_0 \to 1] = \frac{1}{5}$? $\quad T = \{1\}$ $\quad S_0 = \{2, 3, 4, S_4, 5\}$

$r(1) = 1$

$r(S_3) = \frac{1}{2} r(1) + \frac{1}{2} r(2)$

$r(S_4) = 0$

$r(S_1) = \frac{1}{2} r(S_3) + \frac{1}{2} r(S_4)$

$r(S_0) = \frac{1}{2} r(S_1) + \frac{1}{2} r(S_2)$

$r(S_2) = \frac{1}{2} r(S_5) + \frac{1}{2} r(S_0)$

$r(S_5) = \frac{1}{2} r(S_0)$

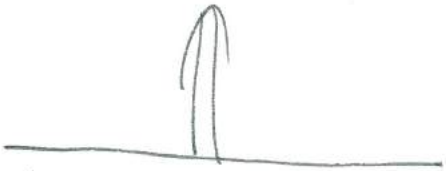
1, 2, 3, 4 are symmetric, so this result applies to all of them

$r(1) = 1 \quad r(S_3) = \frac{1}{2} \quad r(S_1) = \frac{1}{4}$

$r(S_0) = \frac{1}{2} \cdot \frac{1}{4} + \frac{1}{2} r(S_2)$

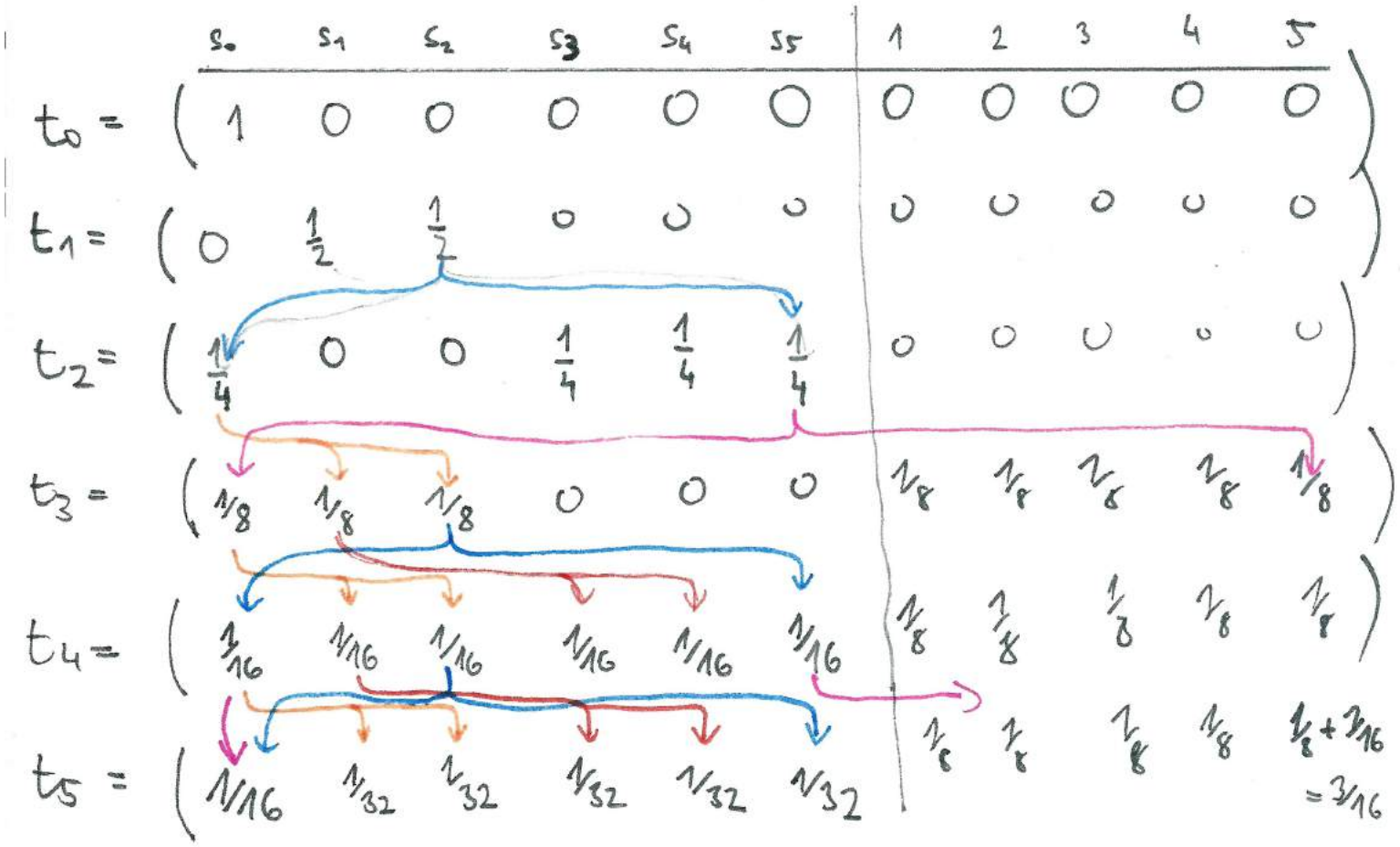
$r(S_2) = \frac{1}{2} r(S_5) + \frac{1}{2} r(S_0)$

$r(S_5) = \frac{1}{2} r(S_0) + \frac{1}{2} r(5)$



$r(S_0) = \frac{1}{5}$, $r(S_2) = \frac{3}{20}$, $r(S_5) = \frac{1}{10}$

↳ so $P[S_0 \to 1] = \frac{1}{5}$ ✓



$$\mathbb{P}\left[s_0 \xrightarrow{\leq 5} \{1,2,3,4,5\}\right] = 4 \cdot \frac{1}{8} + \frac{3}{16} = \underline{\underline{\frac{11}{16}}}$$

$$\mathbb{P}\left[s_0 \xrightarrow{\leq 5} \{1,5\}\right] = \frac{1}{8} + \frac{3}{16} = \underline{\underline{\frac{5}{16}}}$$