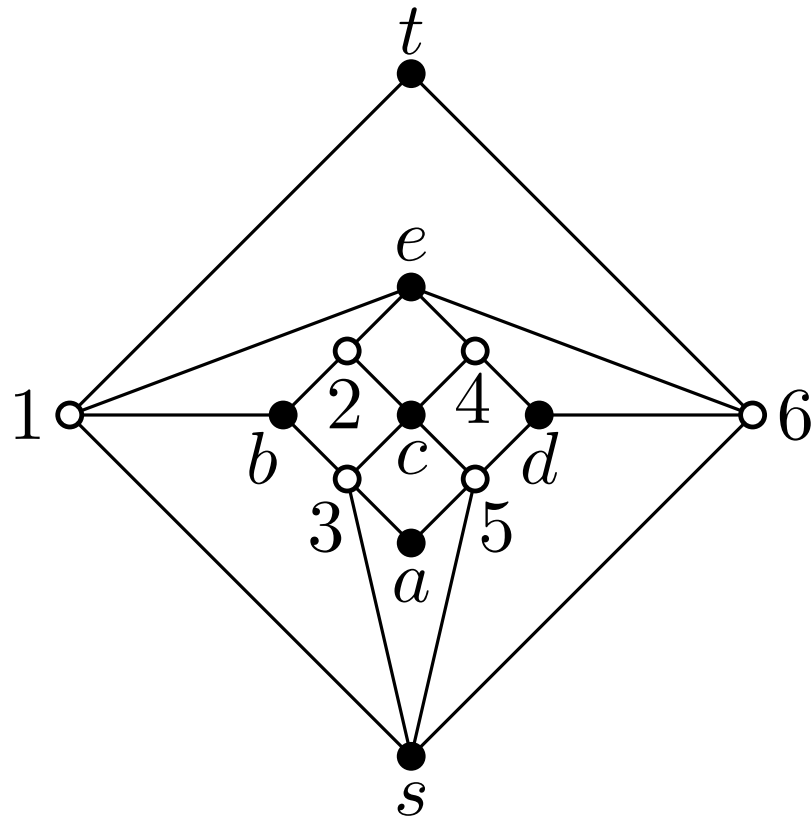
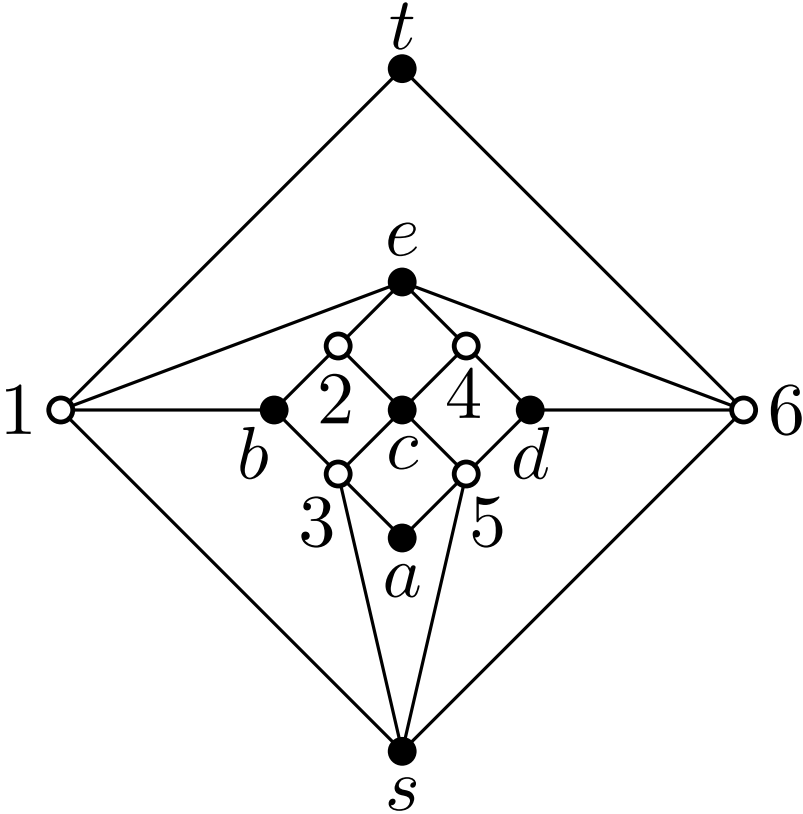


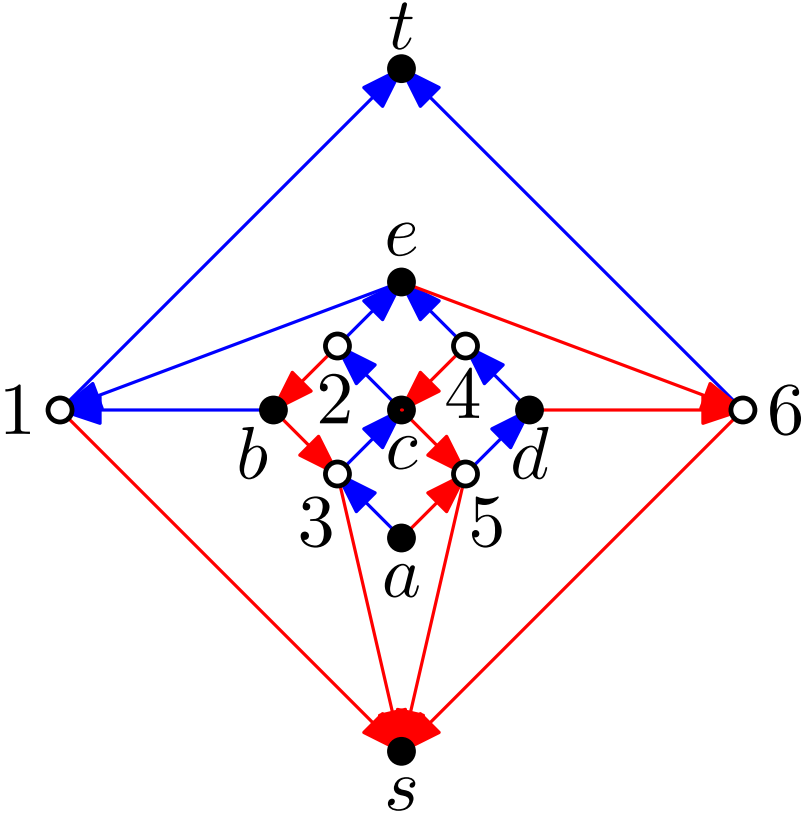
Quadragulation



Quadragulation

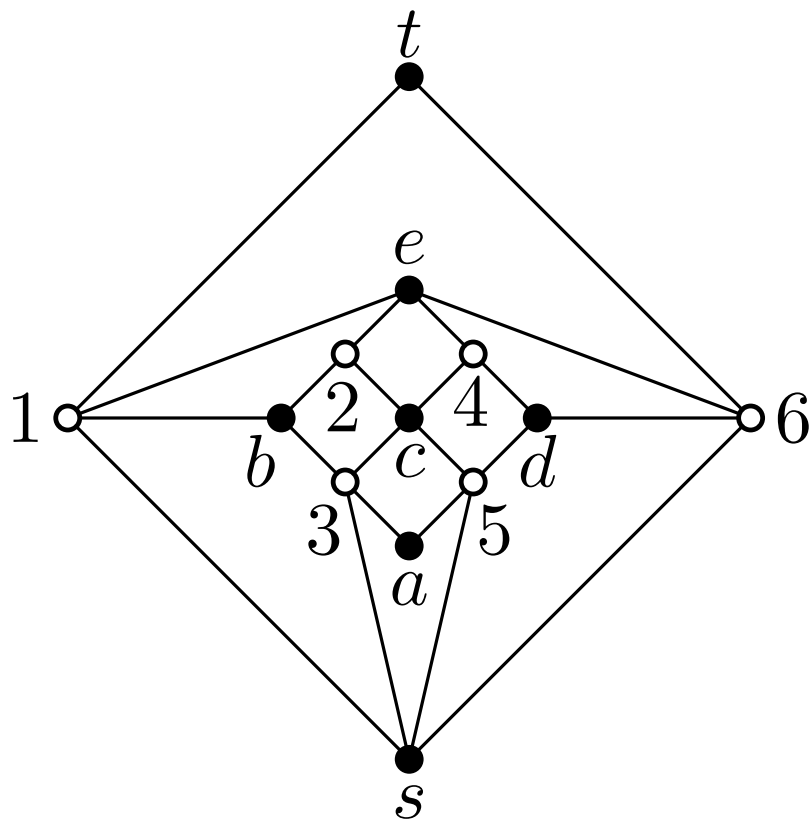


Separating Decomposition

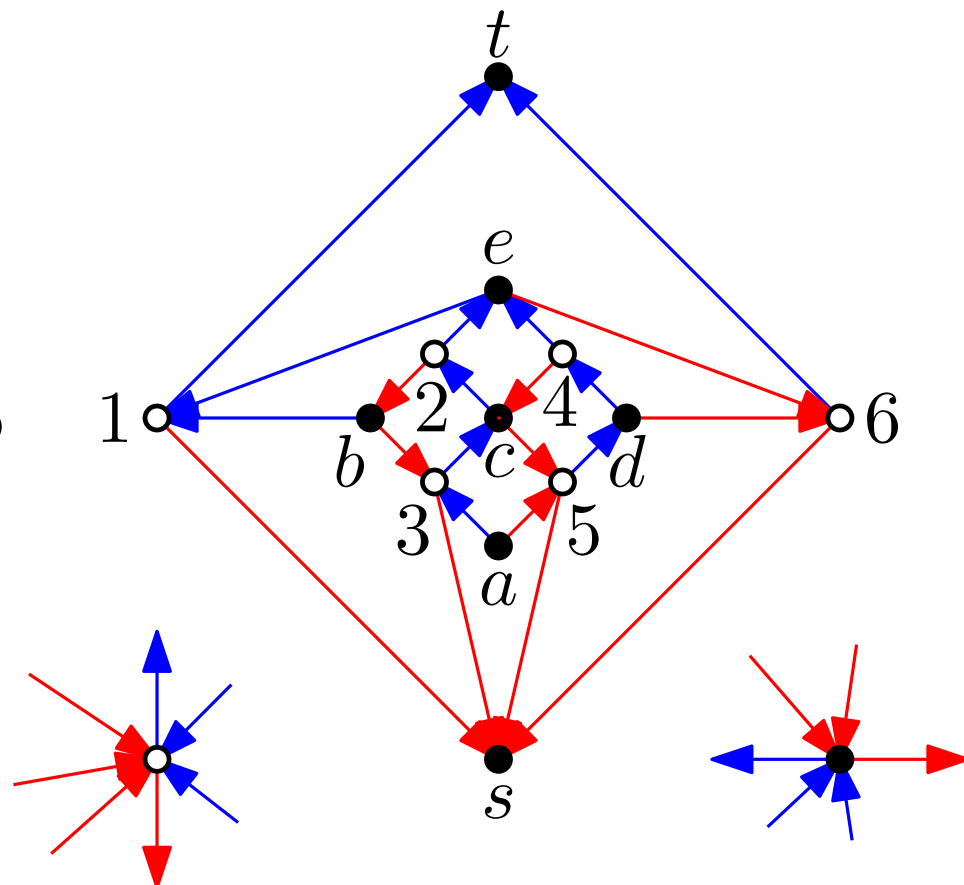


[Felsner]

Quadrangulation



Separating Decomposition



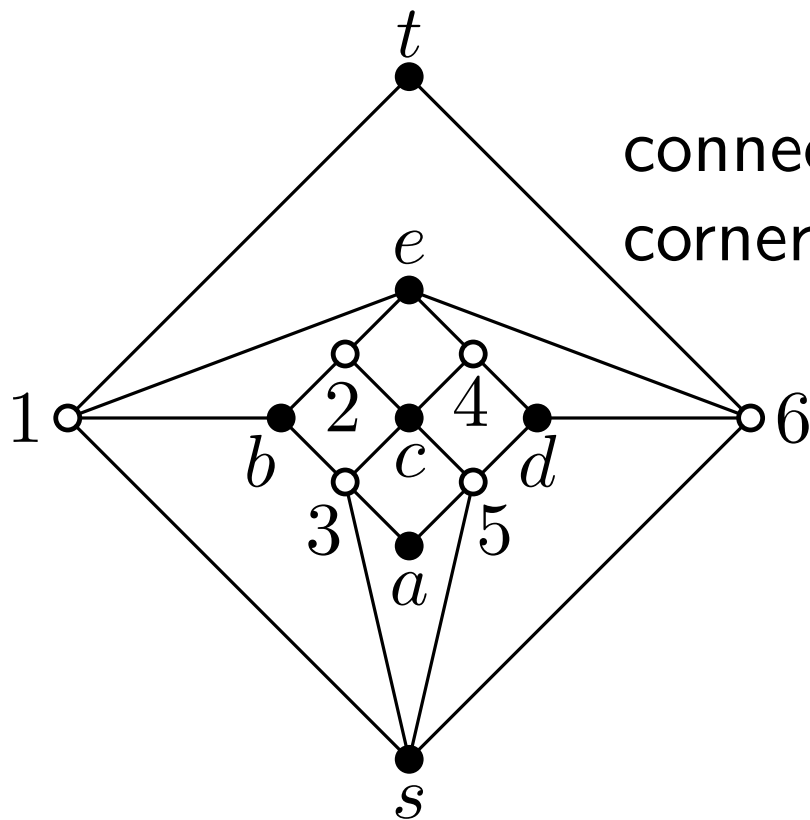
cw first

cw last

in color is outgoing

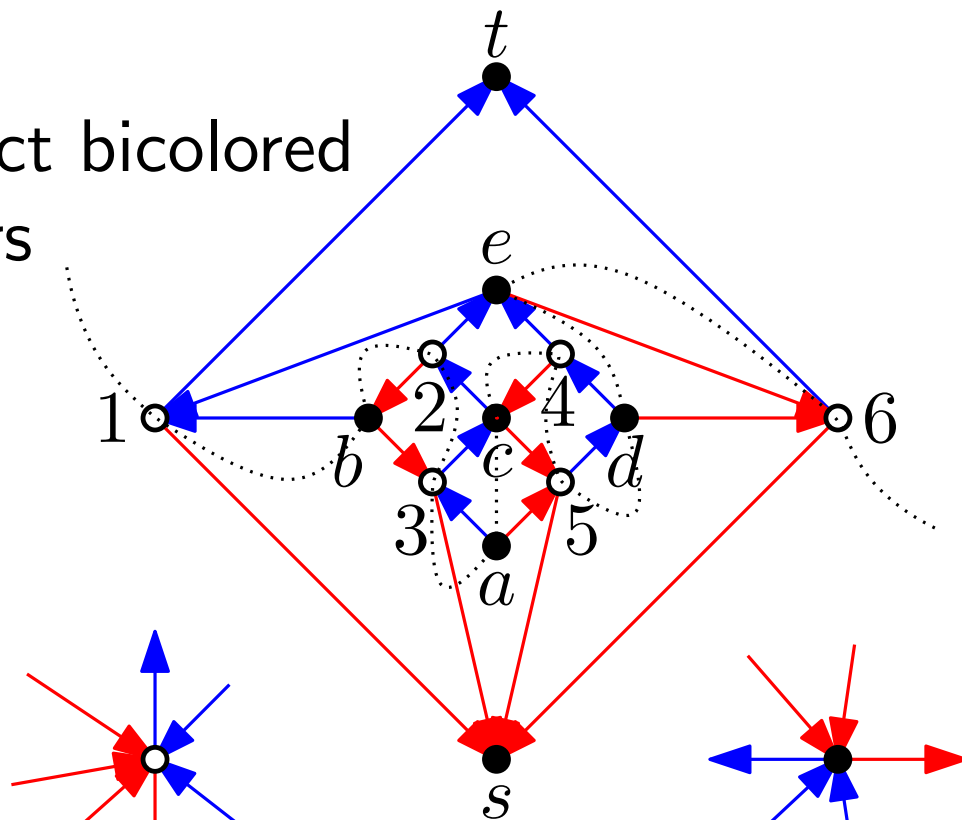
[Felsner]

Quadrangulation



connect bicolored corners

Separating Decomposition



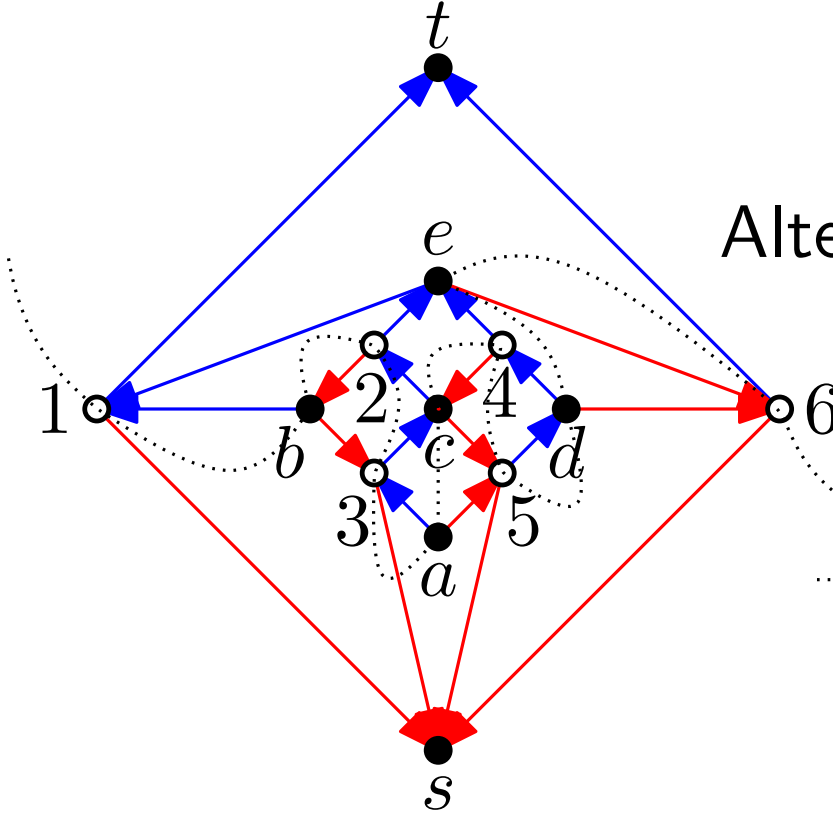
cw first

cw last

in color is outgoing

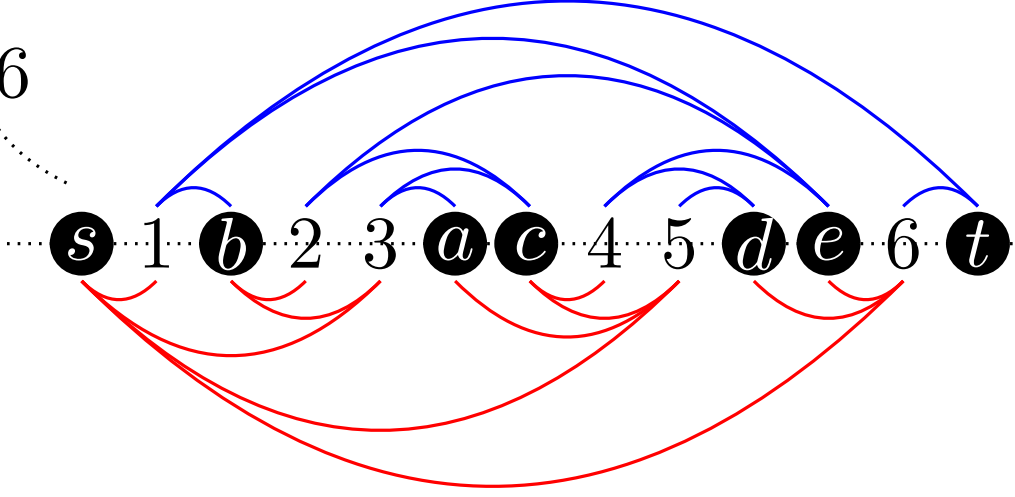
[Felsner]

Separating Decomposition

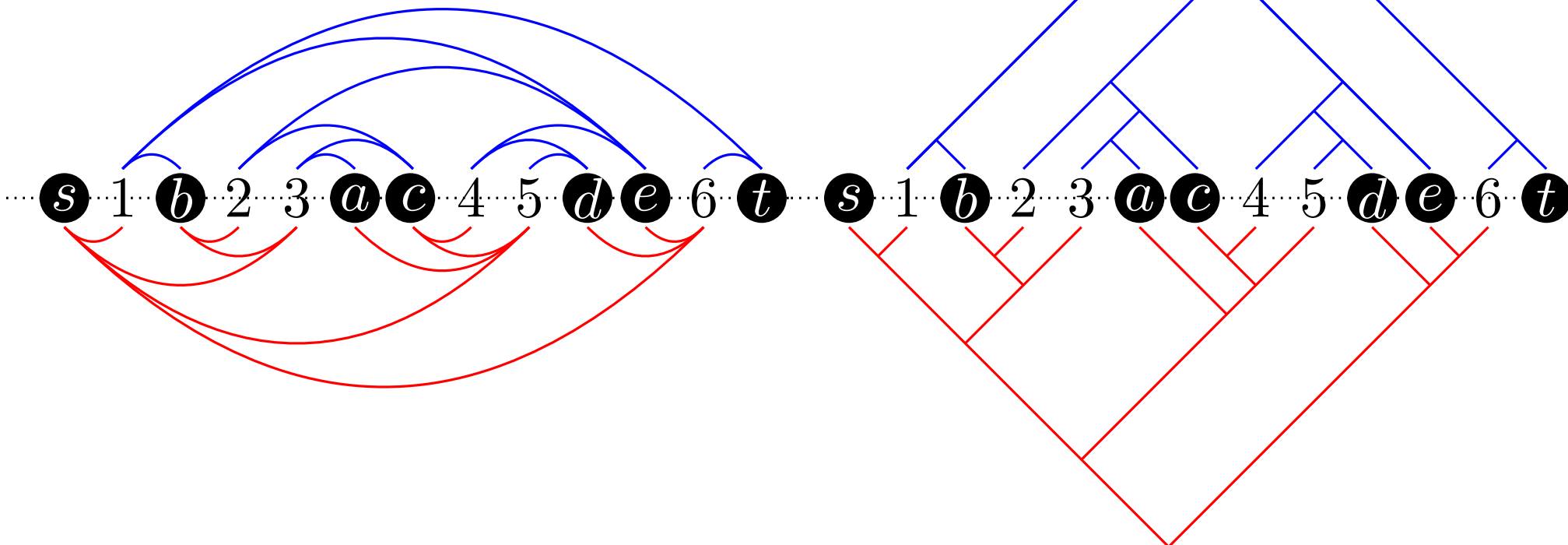


2-page book embedding

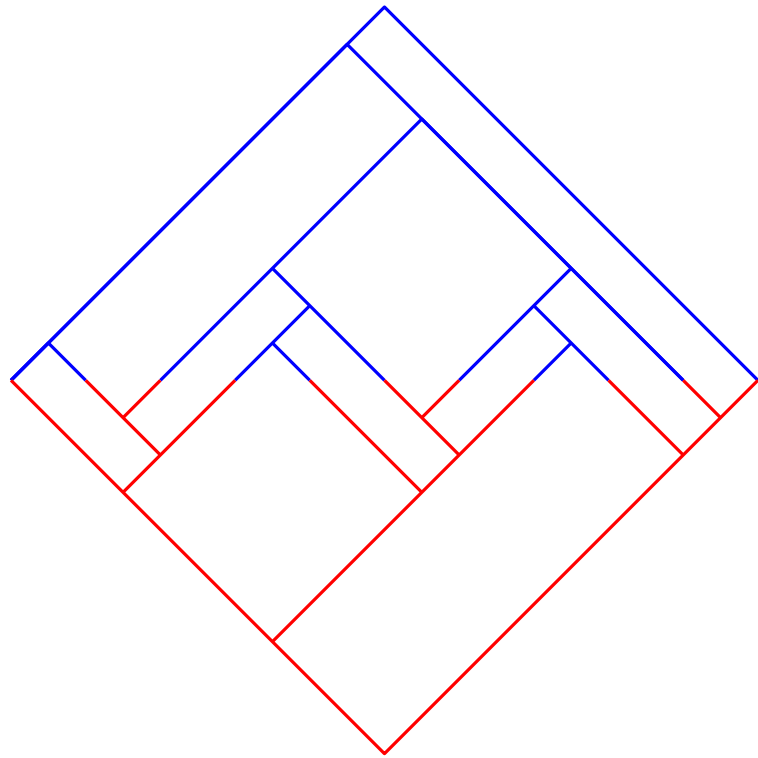
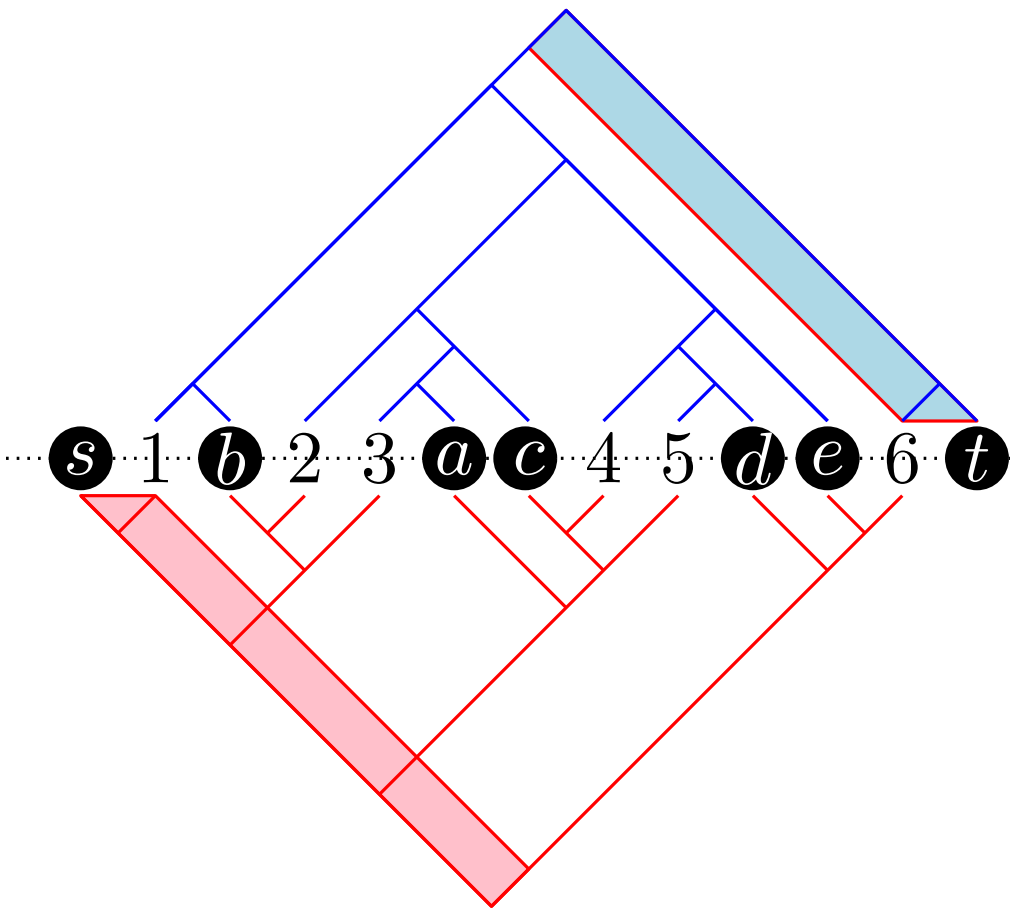
Alternating layout



2-page book embedding

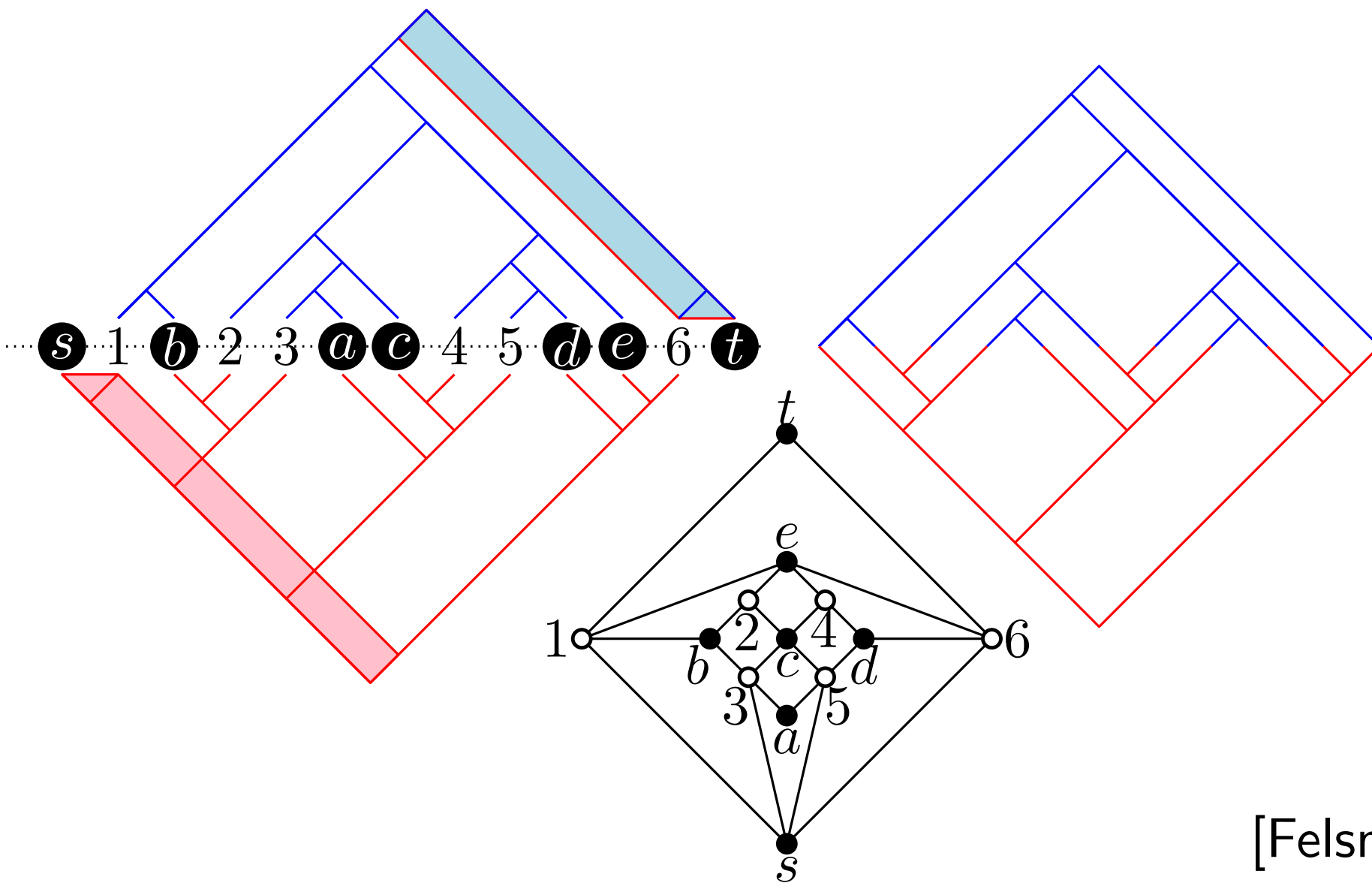


[Felsner]



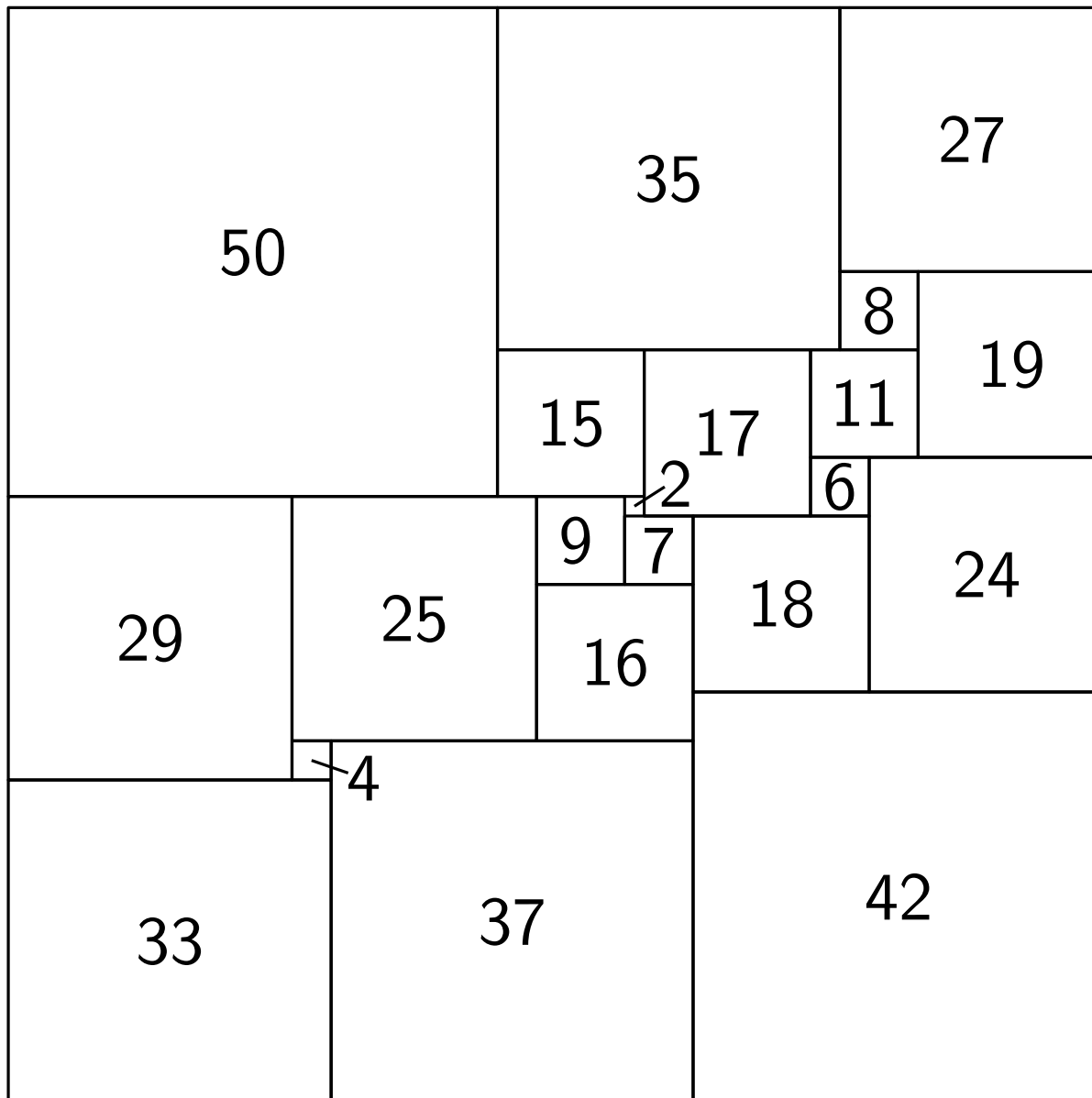
[Felsner]

Contact Representation

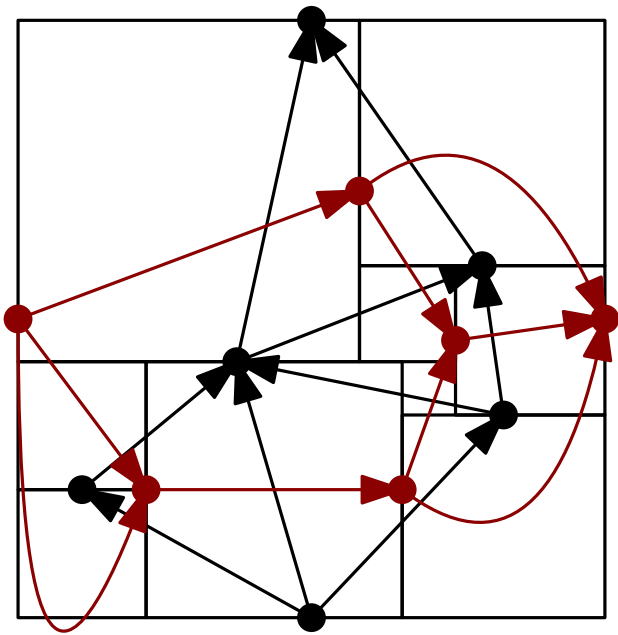


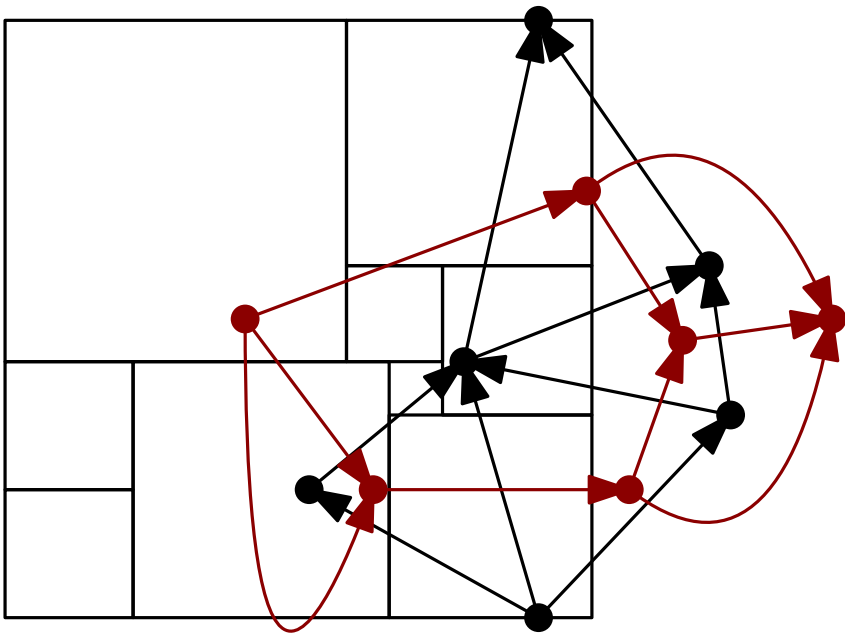
[Felsner]

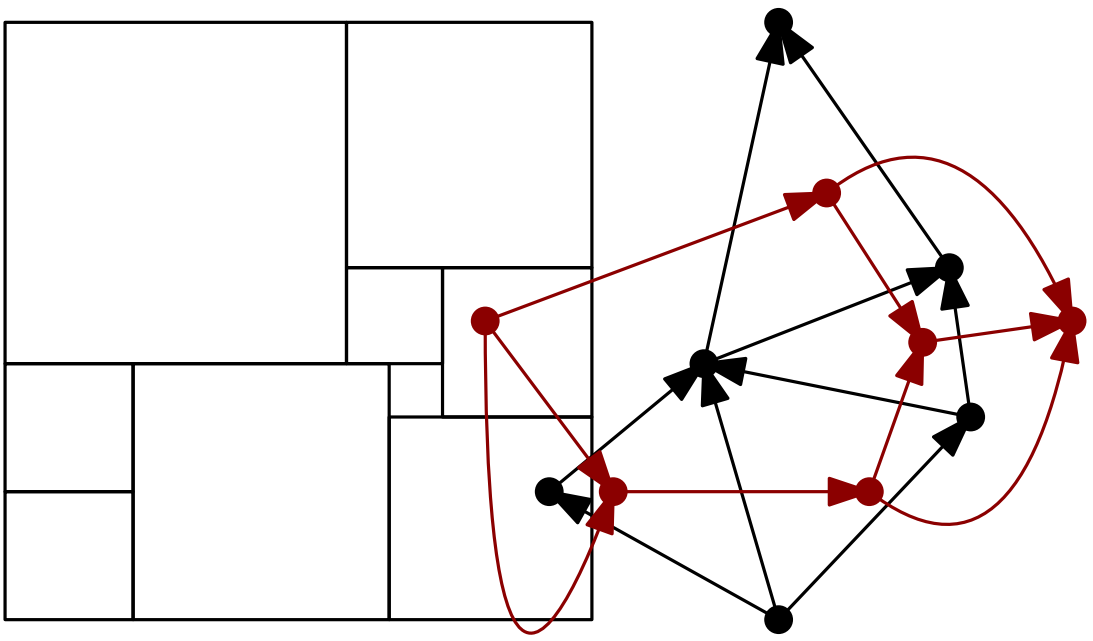
Squarings and Electricity [Felsner]

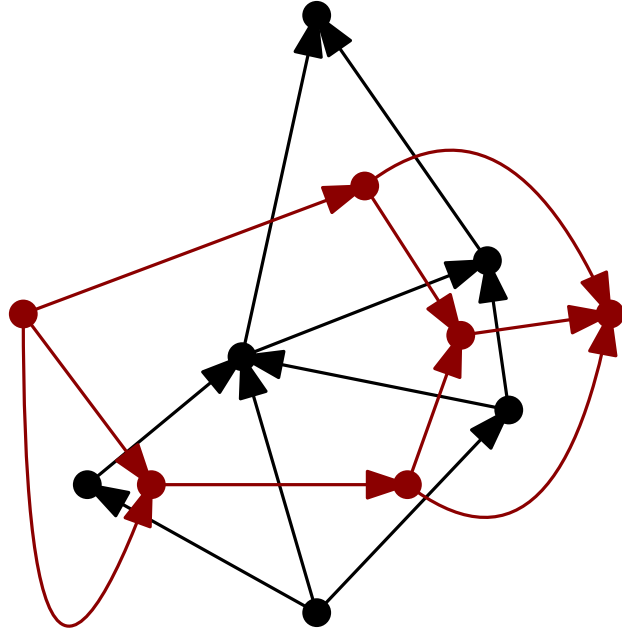
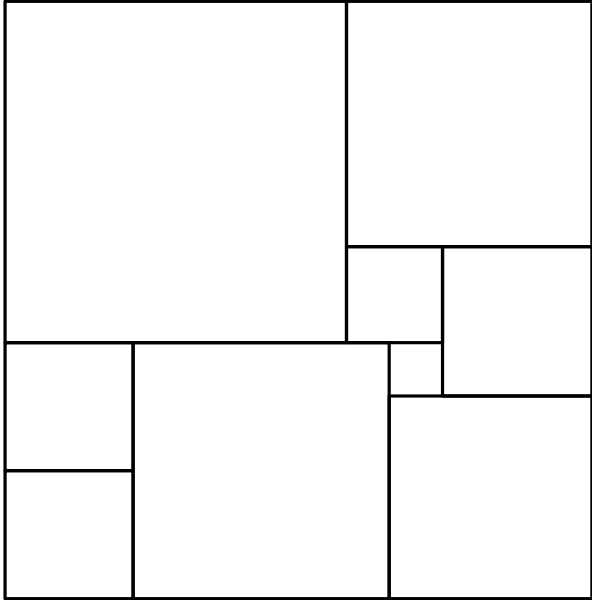


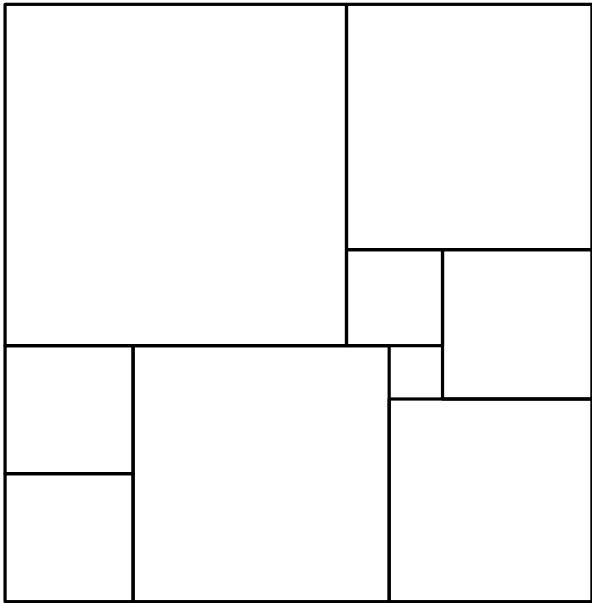
[Duijvestijn 78]



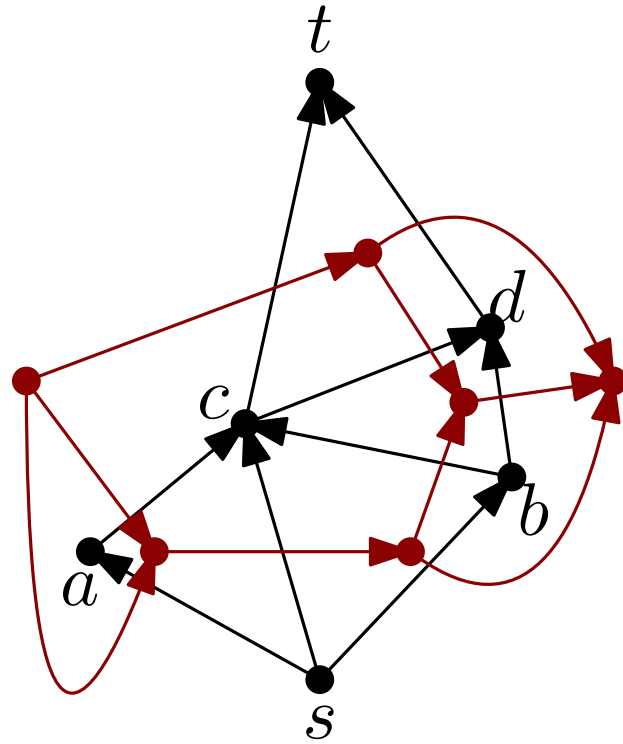




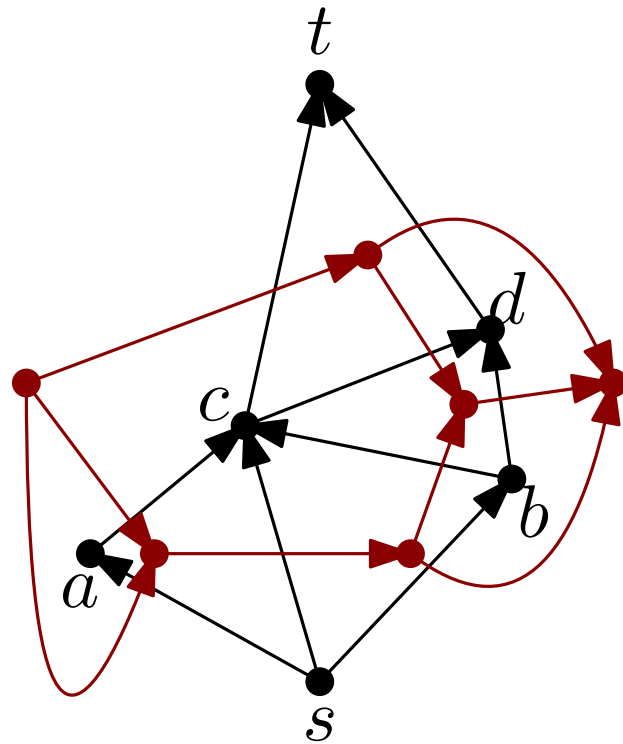




We want to construct
this squaring



We are given these two
bipolar orientations

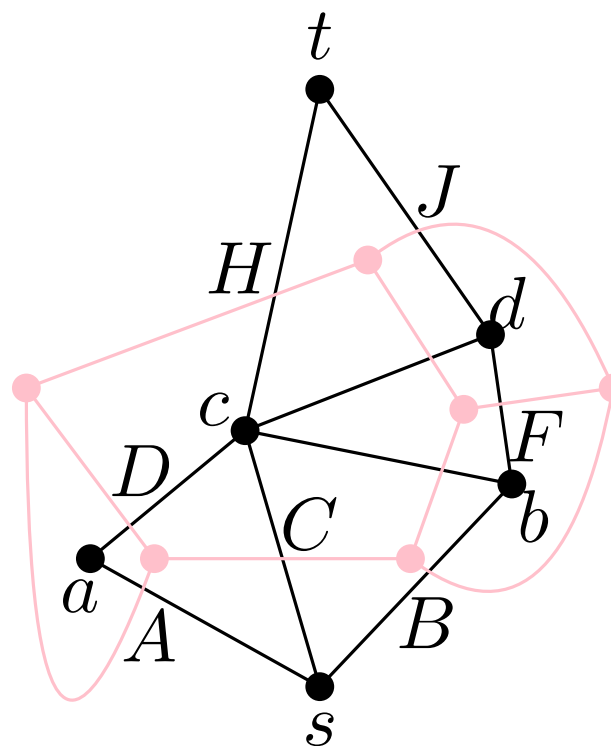


We are given these two bipolar orientations

Spanning Trees (Laplacian Matrix)

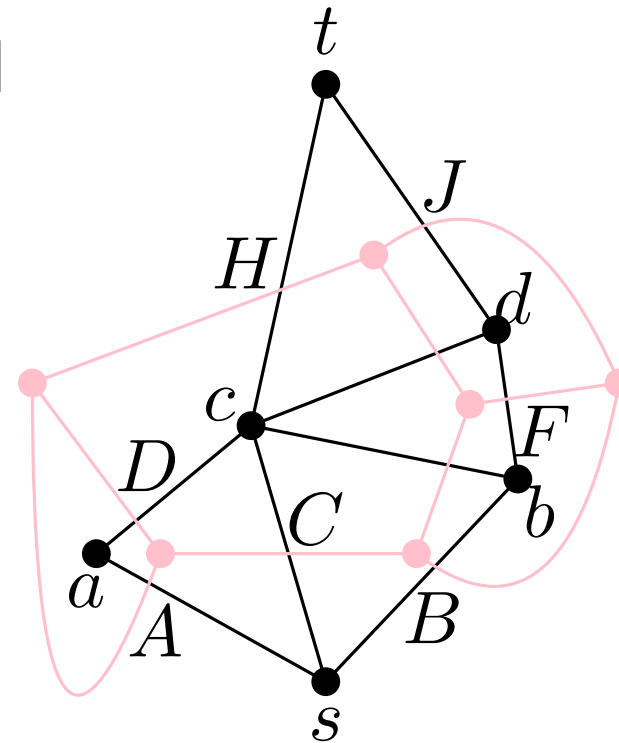
	s	a	b	c	d	t
s	*	A	B	C	0	0
a	A	*	0	D	0	0
b	B	0	*	E	F	0
c	C	D	E	*	G	H
d	0	0	F	G	*	J
t	0	0	0	H	J	*

* = minus row sum



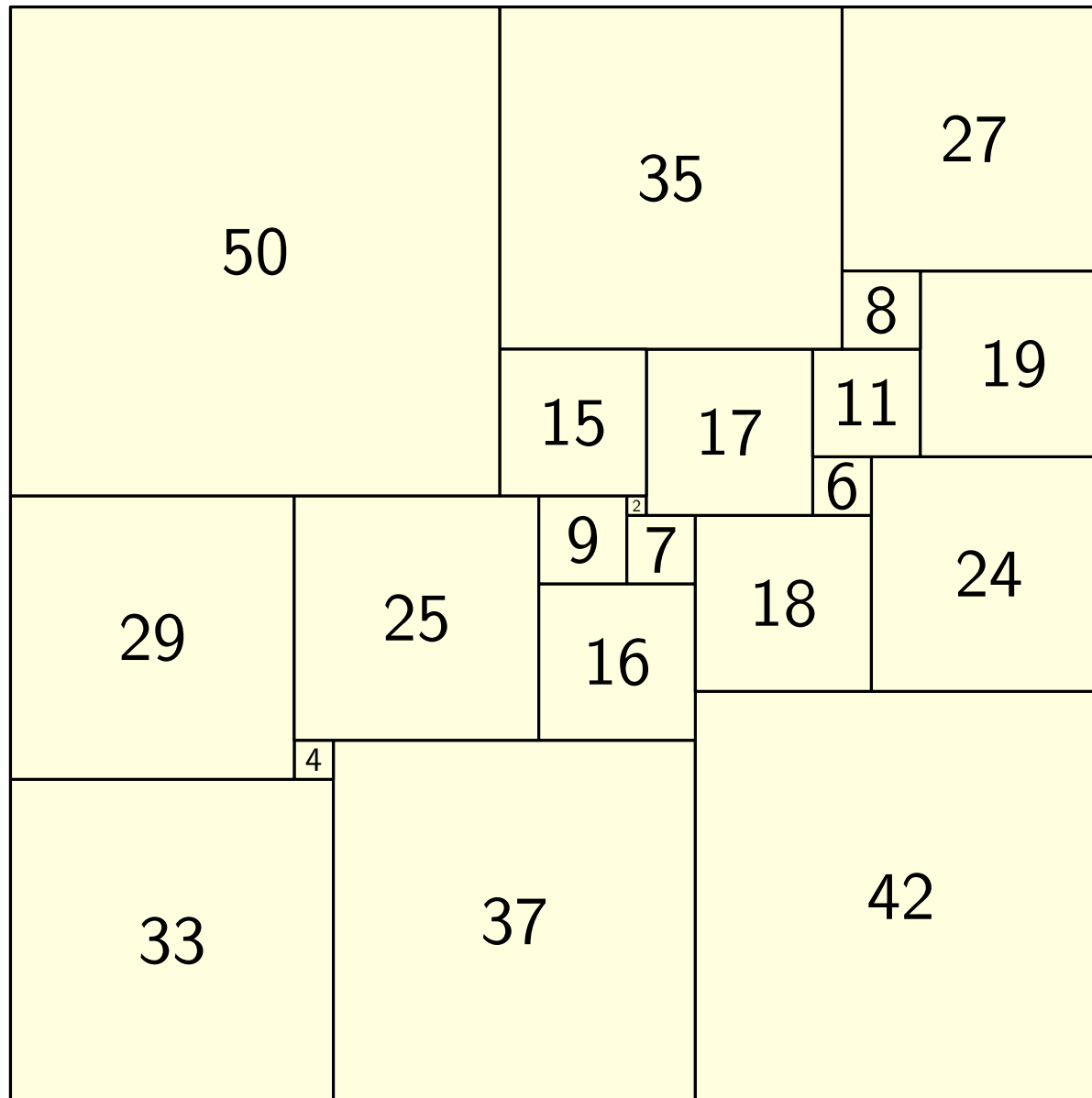
Spanning Trees

ABCFH ABCFJ ABCGH ABCGJ
 ABCHJ ABDFH ABDFJ ABDGH
 ABDGJ ABDHJ ABEFH ABEFJ
 ABEGH ABEGJ ABEHJ ABFGH
 ABFGJ ABFHJ ACEFH ACEFJ
 ACEGH ACEGJ ACEHJ ACFGH
 ACFGJ ACFHJ ADEFH ADEFJ
 ADEGH ADEGJ ADEHJ ADFGH
 ADFGJ ADFHJ BCDFH BCDFJ
 BCDGH BCDGJ BCDHJ BDEFH
 BDEFJ BDEGH BDEGJ CDEGH
 CDEGJ CDEHJ CDFGH CDFGJ
 CDFHJ



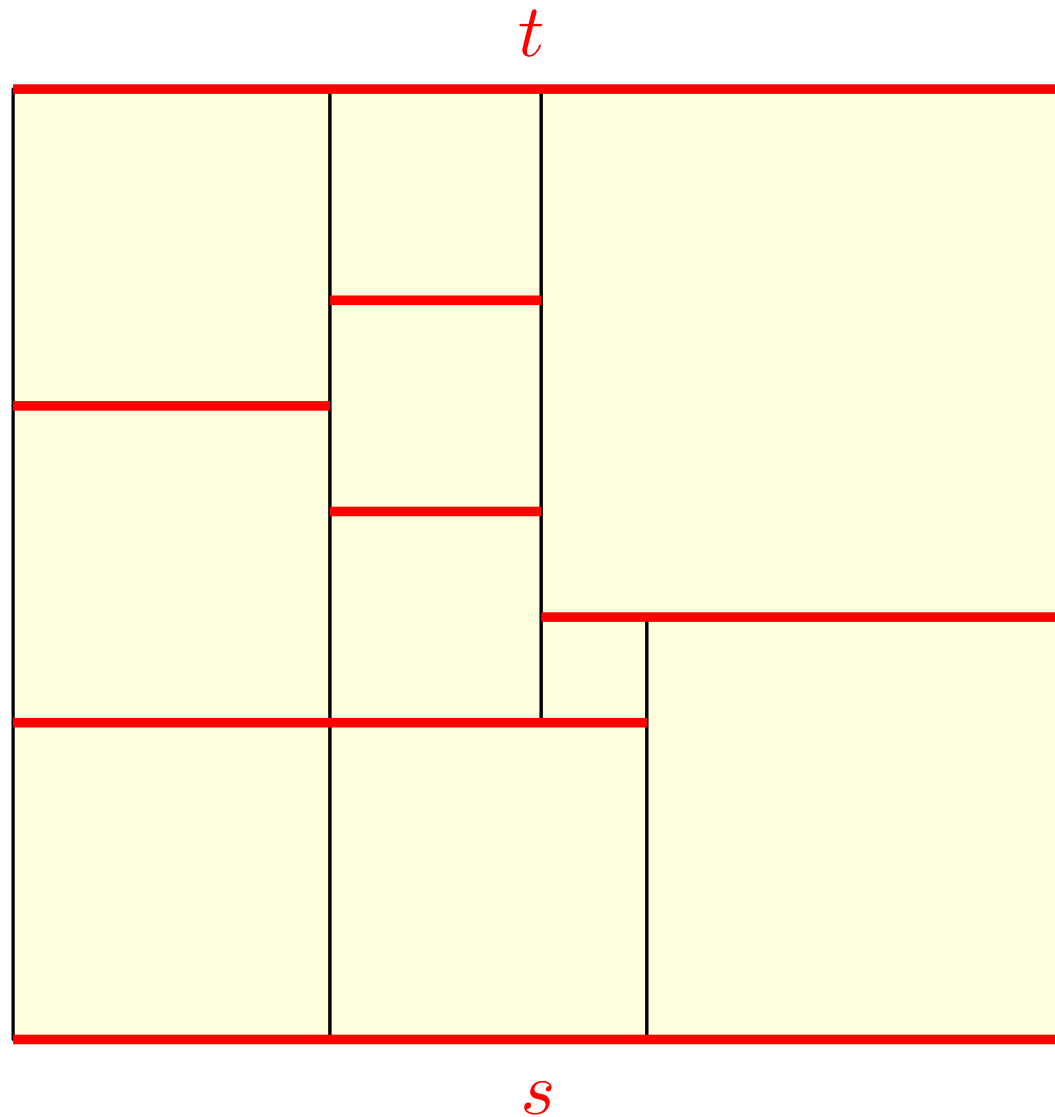
\Leftarrow Terms in the determinant
 of the Laplacian

Perfect Squaring [Brooks, Smith, Stone, Tutte '40]

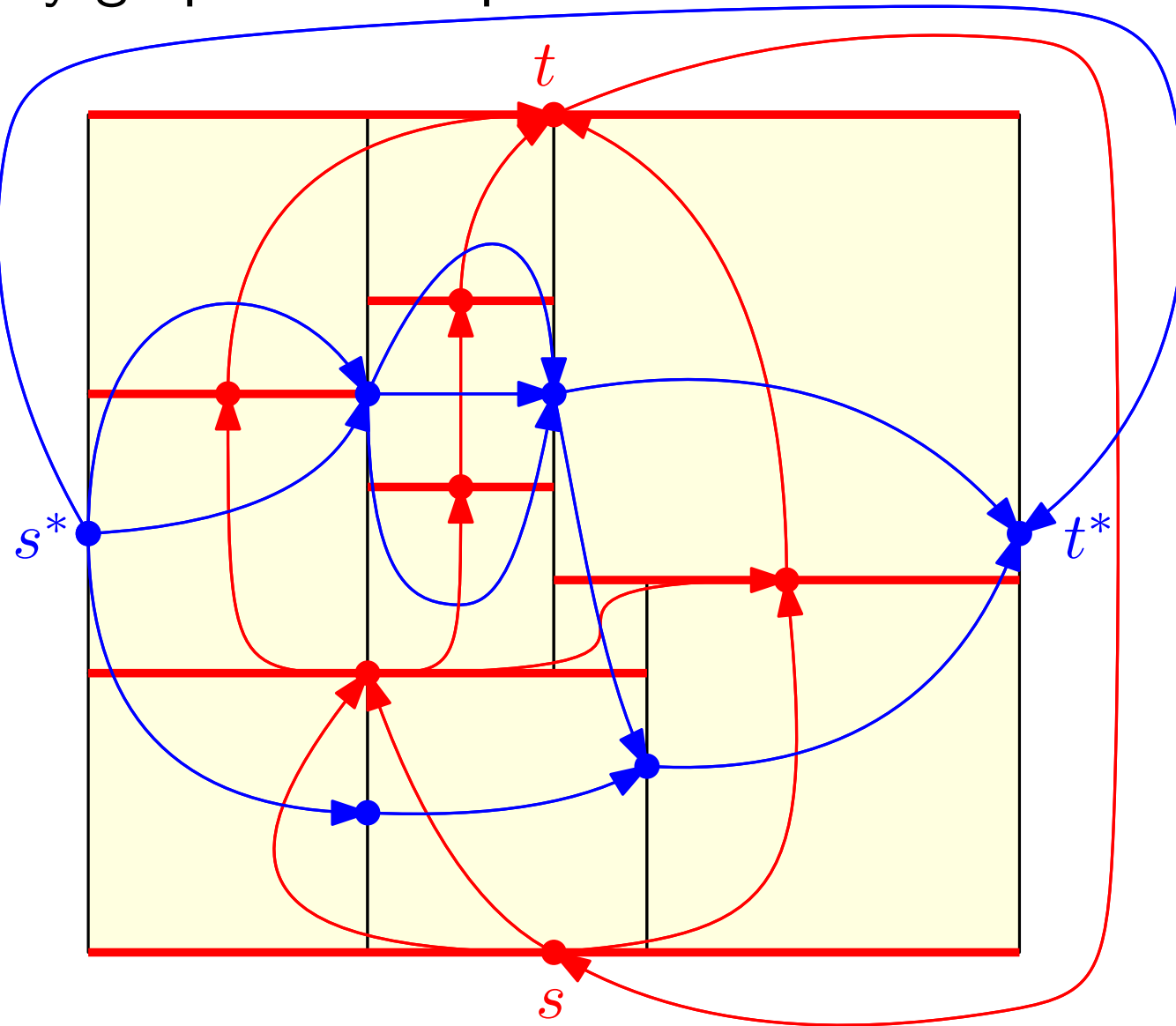


Unique smallest perfect squaring [Duijvestijn '78]

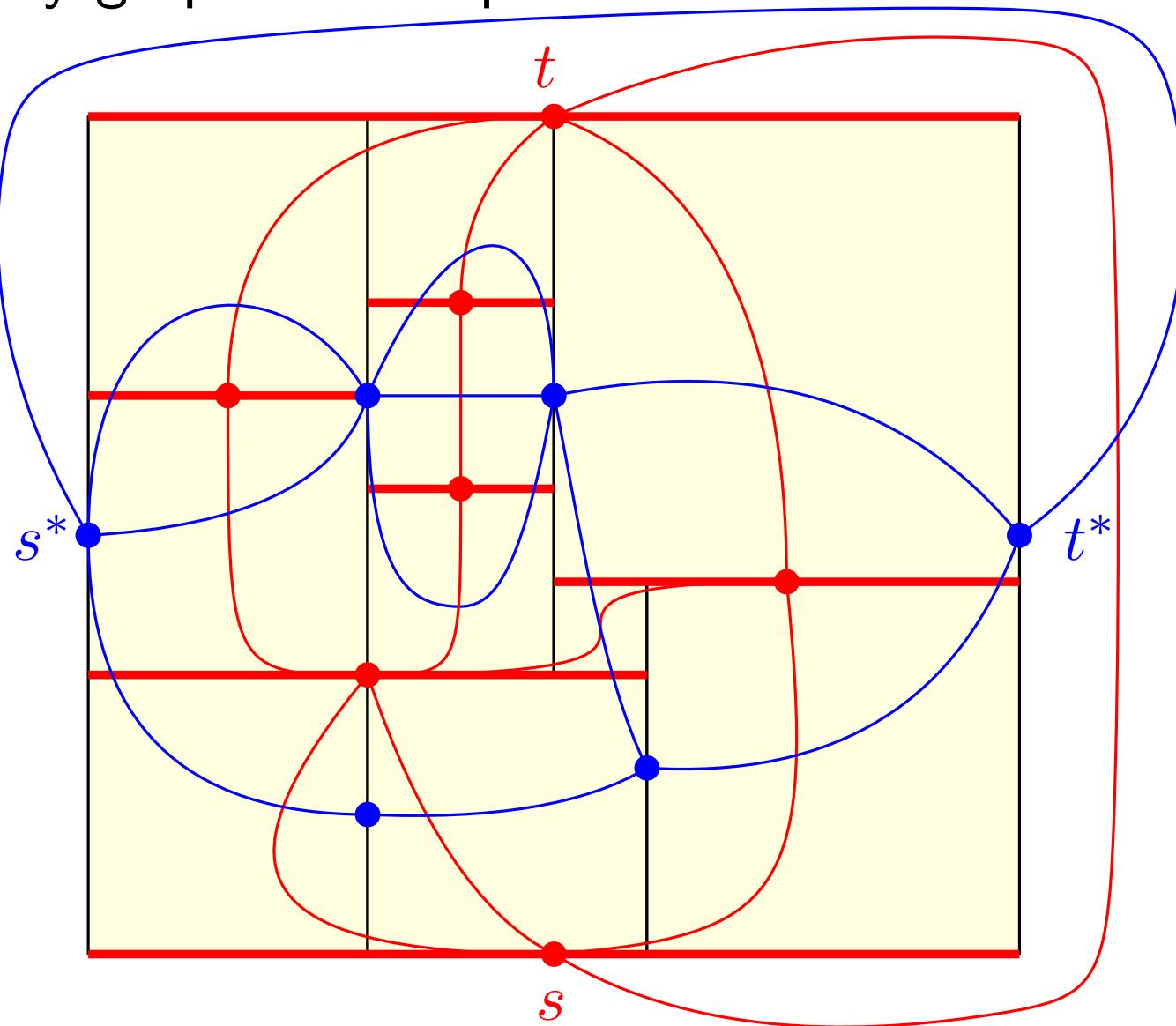
Visibility graph and its planar dual



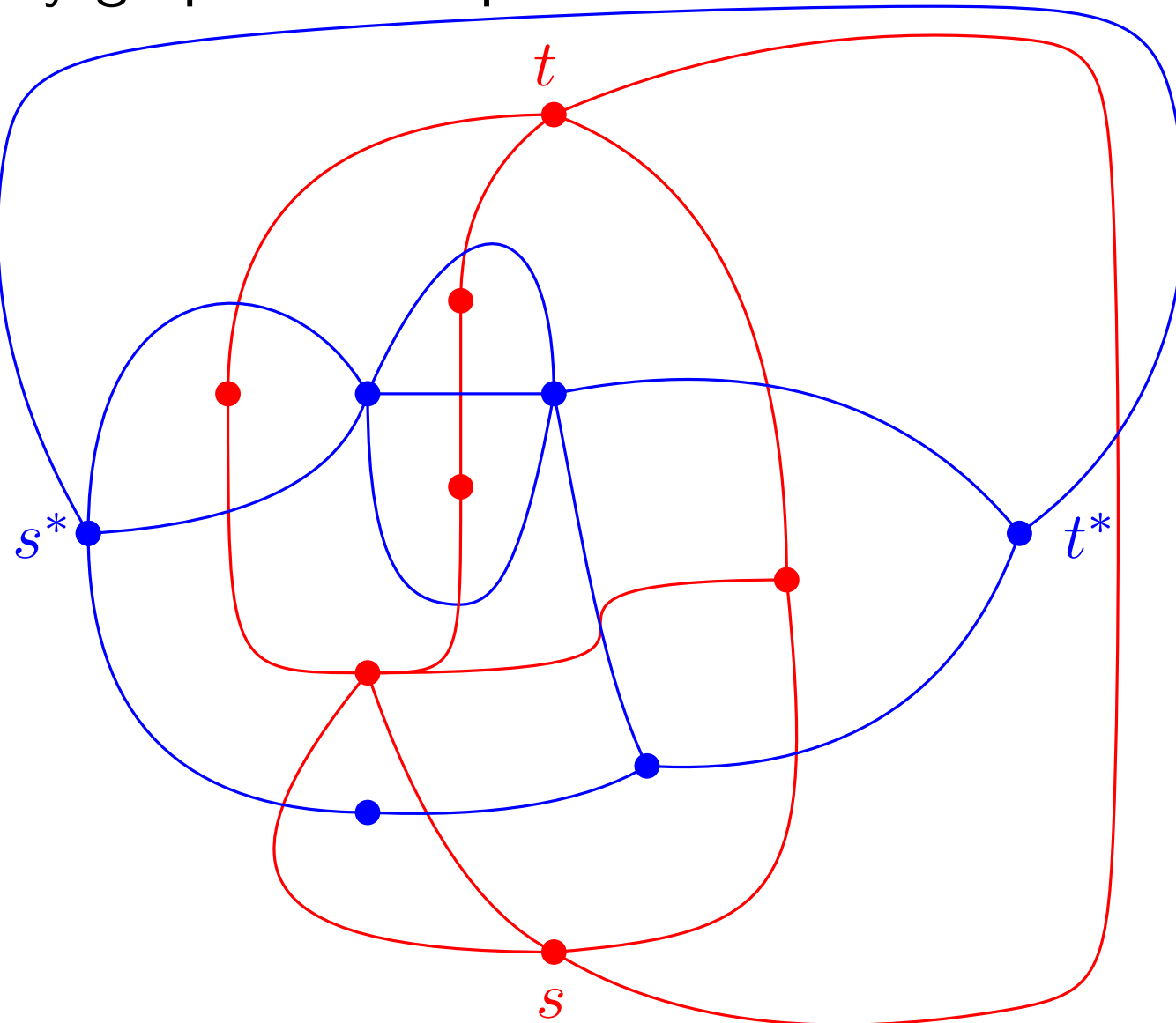
Visibility graph and its planar dual



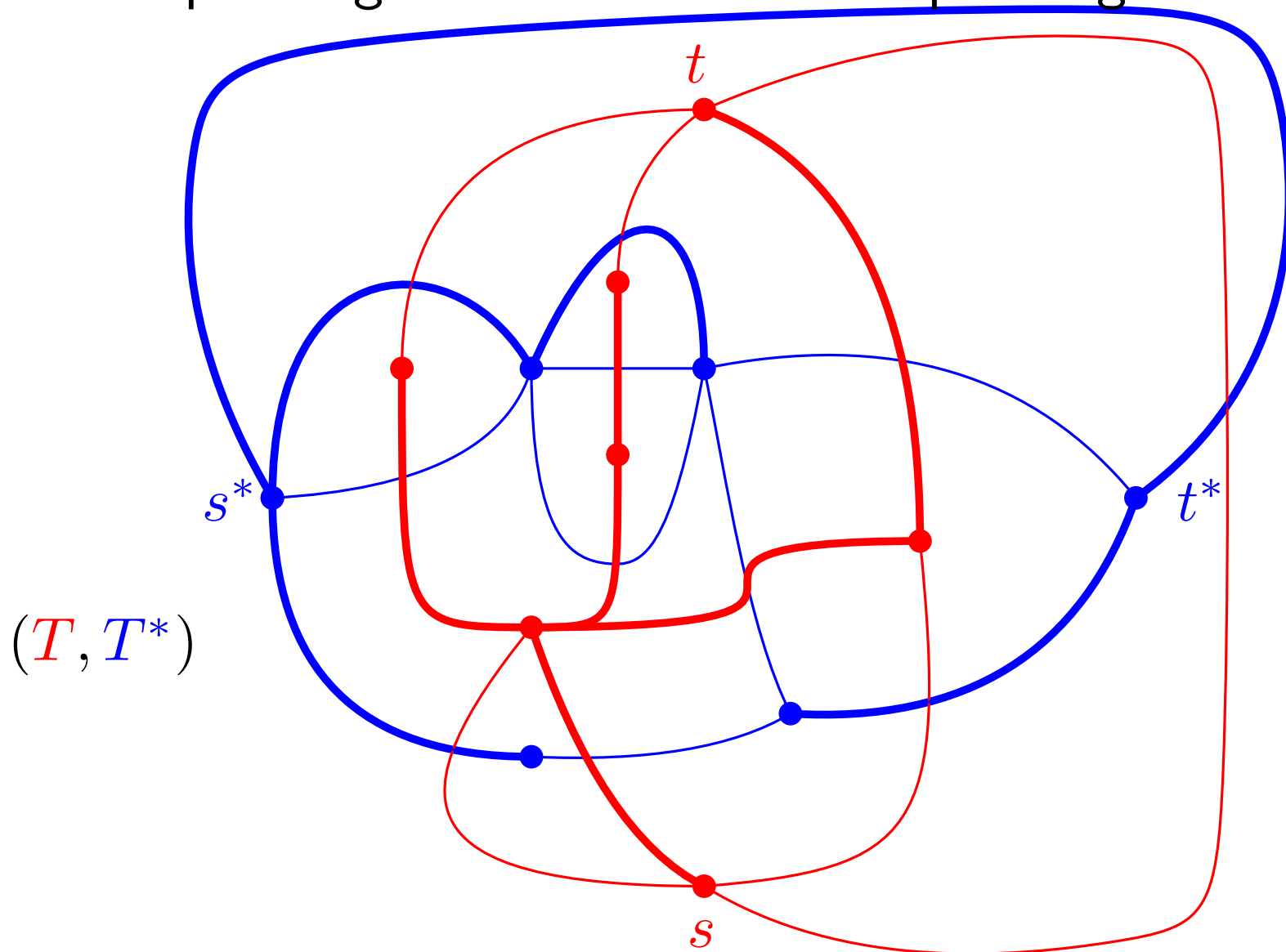
Visibility graph and its planar dual



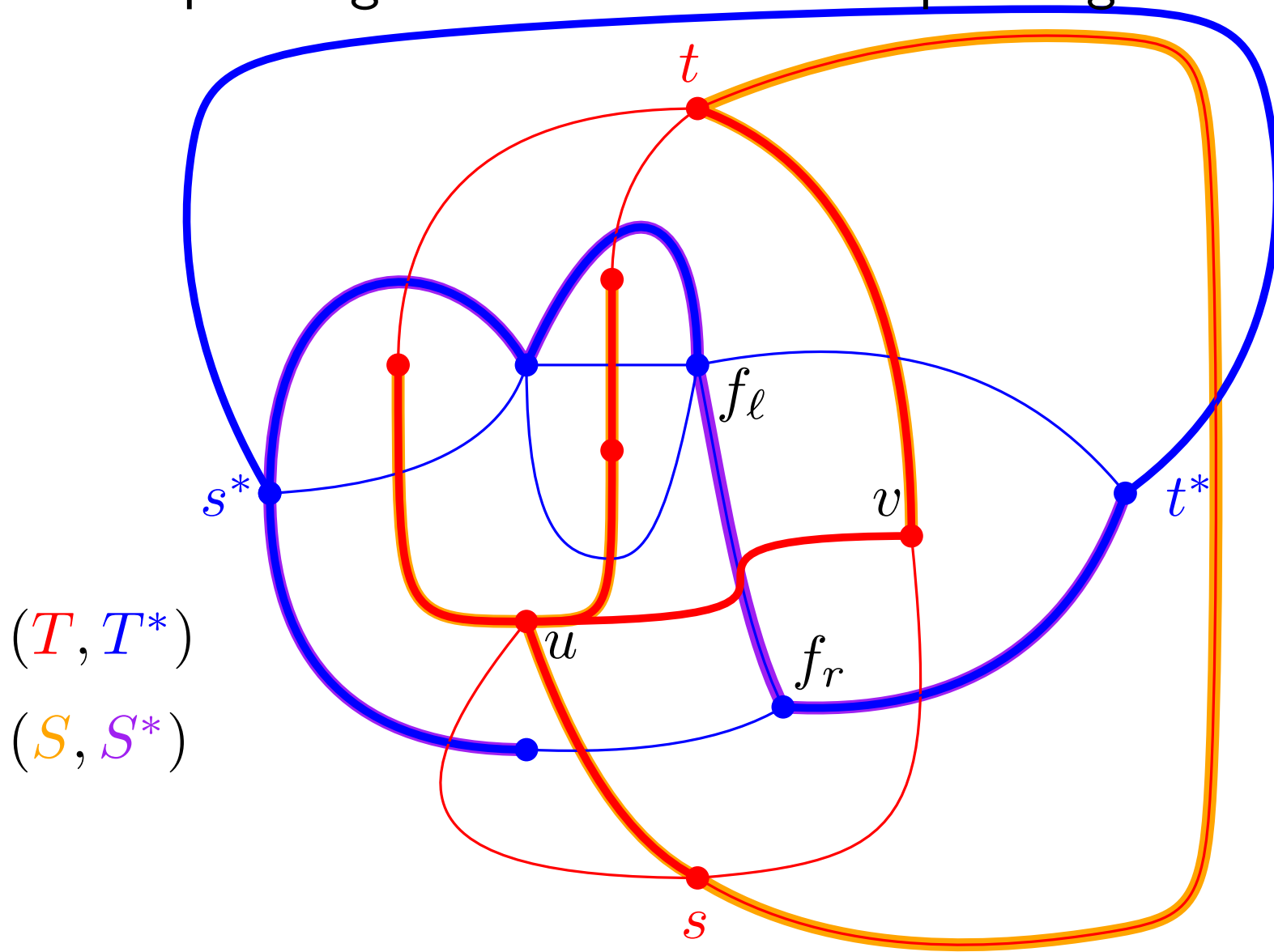
Visibility graph and its planar dual



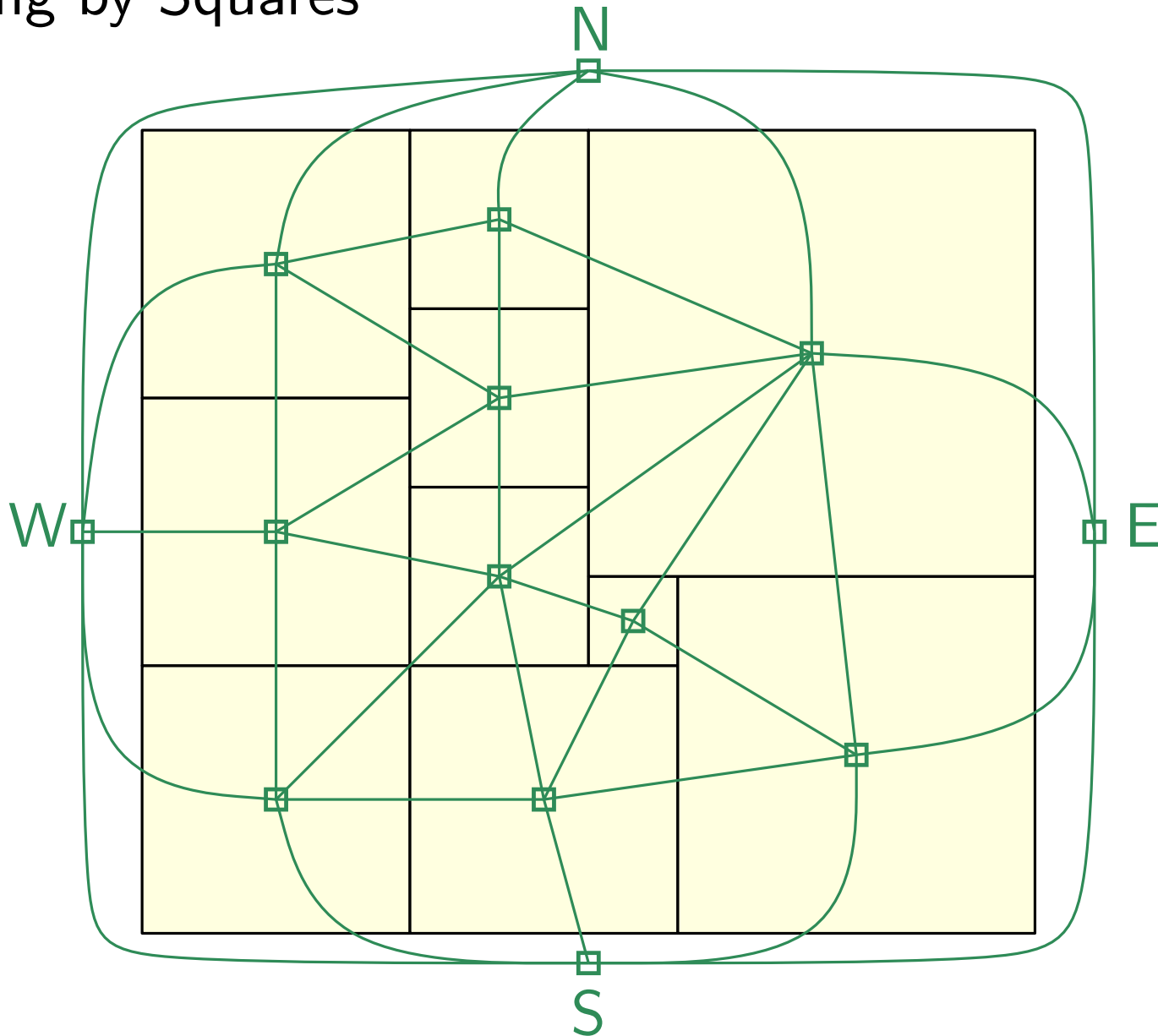
Red spanning tree and Blue dual spanning tree



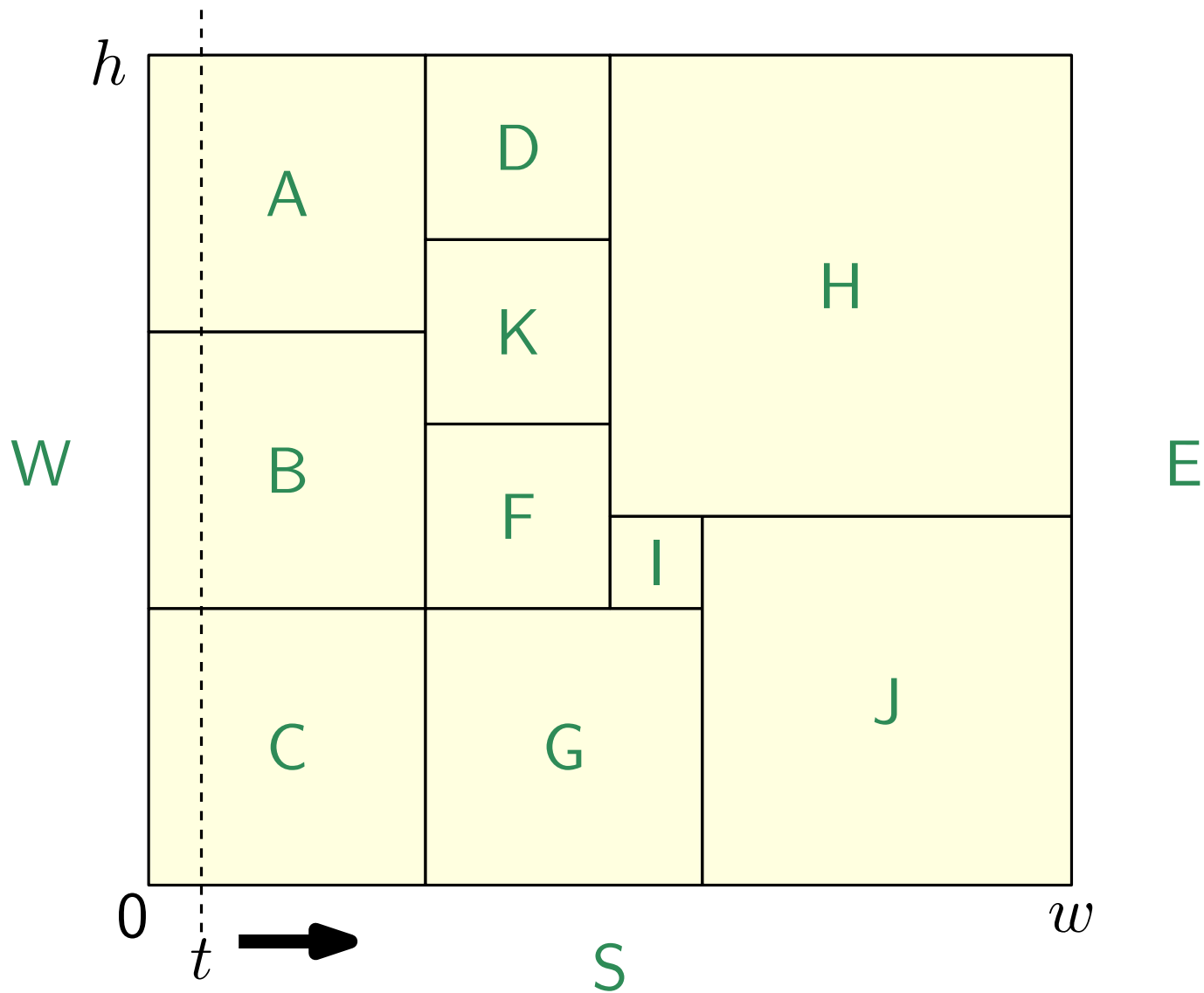
Red spanning tree and Blue dual spanning tree



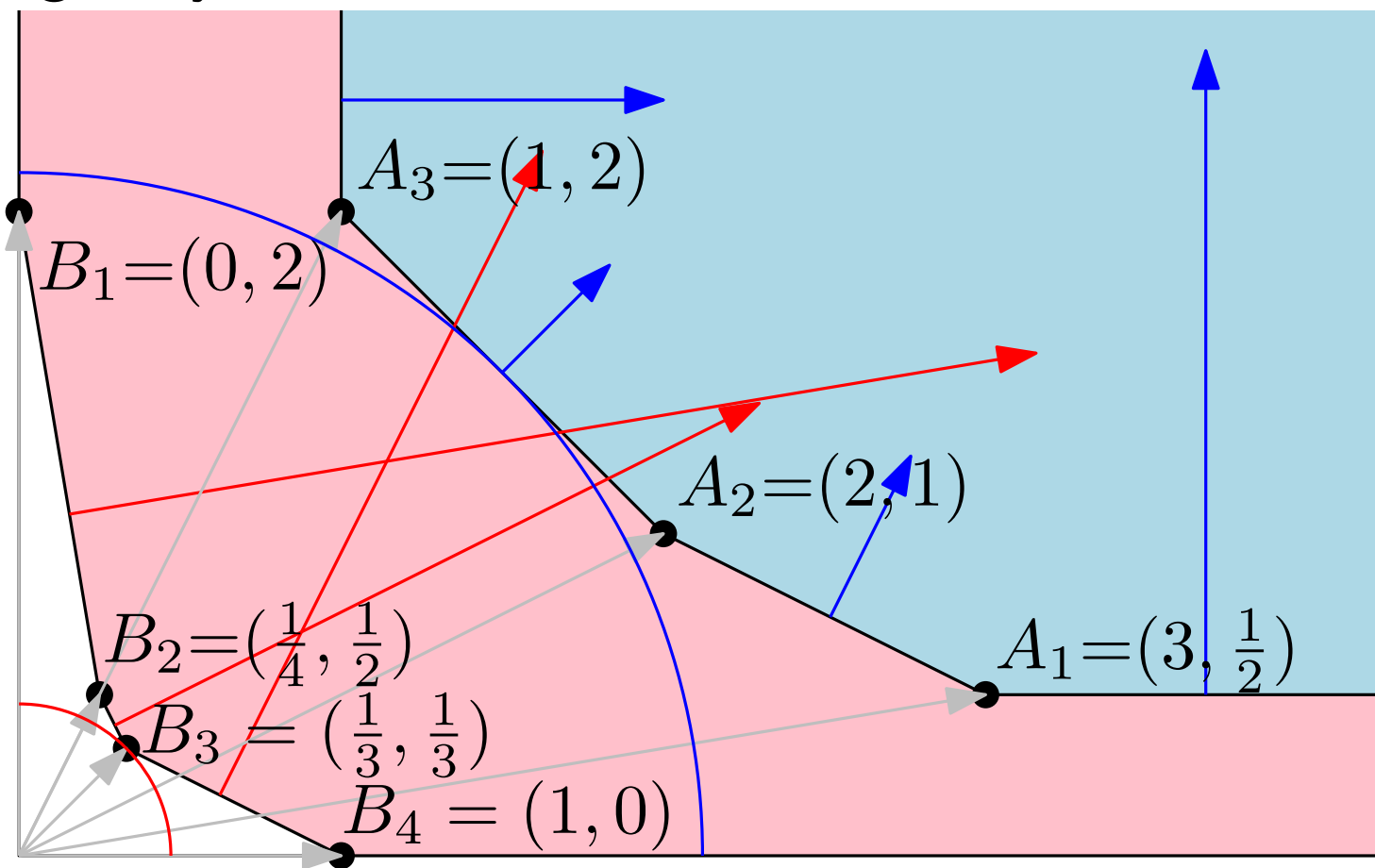
Tiling by Squares



$$\gamma_t = \{A, B, C\} \quad N$$



Blocking Polyhedra



$$\hat{B} = A = \begin{bmatrix} 3 & 1/2 \\ 2 & 1 \\ 1 & 2 \end{bmatrix}$$

$$\hat{A} = B = \begin{bmatrix} 0 & 2 \\ 1/4 & 1/2 \\ 1/3 & 1/3 \\ 1 & 0 \end{bmatrix}$$