

Introduction to Discrete Mathematics

Some Solutions

10.1.

\Rightarrow : Let A contain a minimal set C of linear dependent columns. Every vertex of the subgraph induced by C has even degree. This subgraph therefore is decomposable into cycles.

\Leftarrow : Suppose A contains a cycle C . Every vertex incident with edges of C occurs twice in the sum of the columns of C , and no other vertex occurs. Therefore the sum of the columns of C is a zero column.

11.1.

	1	2	3	4	5	$k = 1$	1	2	3	4	5
1	$\infty, 0$	6, 1	5, 1	$\infty, 0$	$\infty, 0$	1	$\infty, 0$	6, 1	5, 1	$\infty, 0$	$\infty, 0$
2	$\infty, 0$	$\infty, 0$	7, 2	3, 2	-2, 2	2	$\infty, 0$	$\infty, 0$	7, 2	3, 2	-2, 2
3	$\infty, 0$	$\infty, 0$	$\infty, 0$	-4, 3	8, 3	3	$\infty, 0$	$\infty, 0$	$\infty, 0$	-4, 3	8, 3
4	$\infty, 0$	-1, 4	$\infty, 0$	$\infty, 0$	$\infty, 0$	4	$\infty, 0$	-1, 4	$\infty, 0$	$\infty, 0$	$\infty, 0$
5	2, 5	$\infty, 0$	$\infty, 0$	7, 5	$\infty, 0$	5	2, 5	8, 1	7, 1	7, 5	$\infty, 0$
$k = 2$	1	2	3	4	5	$k = 3$	1	2	3	4	5
1	$\infty, 0$	6, 1	5, 1	9, 2	4, 2	1	$\infty, 0$	6, 1	5, 1	1, 3	4, 2
2	$\infty, 0$	$\infty, 0$	7, 2	3, 2	-2, 2	2	$\infty, 0$	$\infty, 0$	7, 2	3, 2	-2, 2
3	$\infty, 0$	$\infty, 0$	$\infty, 0$	-4, 3	8, 3	3	$\infty, 0$	$\infty, 0$	$\infty, 0$	-4, 3	8, 3
4	$\infty, 0$	-1, 4	6, 2	2, 2	-3, 2	4	$\infty, 0$	-1, 4	6, 2	2, 2	-3, 2
5	2, 5	8, 1	7, 1	7, 5	6, 2	5	2, 5	8, 1	7, 1	3, 3	6, 2
$k = 4$	1	2	3	4	5	$k = 5$	1	2	3	4	5
1	$\infty, 0$	0, 4	5, 1	1, 3	-2, 2	1	0, 5	0, 4	5, 1	1, 3	-2, 2
2	$\infty, 0$	2, 4	7, 2	3, 2	-2, 2	2	0, 5	0, 4	5, 1	1, 3	-2, 2
3	$\infty, 0$	-5, 4	2, 2	-4, 3	-7, 2	3	-5, 5	-5, 4	0, 1	-4, 3	-7, 2
4	$\infty, 0$	-1, 4	6, 2	2, 2	-3, 2	4	-1, 5	-1, 4	4, 1	0, 3	-3, 2
5	2, 5	2, 4	7, 1	3, 3	0, 2	5	2, 5	2, 4	7, 1	3, 3	0, 2

11.2.

Lösung: Example: 3 via *sadt*, 5 via *sacft*, 2 via *sbeft*, 2 via *sbcft*, 1 via *sbedft*, 1 via *sbedfgt*, 3 via *sbedcftg*, 1 via *sbedacftg*. Cut: *ac*, *bc*, *dc*, *ce*, *df*, *dt*, *eg*.