Comparison of Brute Force VS FPT implementation of Vertex Cover problem for varied input graphs

* For the comparison, the input instances’ number of vertices generated are upper-bounded by a small integer (here 70) because of computability issues. However, the graph generating python program is generalised and can be used to generate graphs of any size by changing a single parameter to the random function.

* The input specification is like this: The first line is the parameter ‘k’. Next following lines are the edges in the graph. The single number lines are the isolated vertices in the graph.

Comparison of running times:

Number of vertices	parameter k	Brute force algorithm running time (seconds)	FPT algorithm running time (seconds)
27	13	753.95	0.00034
32	15	28.99	0.0004
19	8	1.6	0.00017
30	20	1236	0.001
40	15	26.33	0.0006
15	5	0.06	0.0001
10	5	0.018	0.0013
57	30	38	0.0016
54	20	32	0.0011
70	30	32.84	0.00239
37	13	47	0.0004
13	6	0.08	0.00011
16	7	0.265	0.00013
58	27	43.28	0.0016
26	14	392.485	0.00034
39	19	28.51	0.00070
11	5	0.046	0.000093
37	17	62.13	0.00059

Number of vertices	parameter k	Brute force algorithm running time (seconds)	FPT algorithm running time (seconds)
33	9	605.763	0.00031
44	15	93.33	0.0003
36	17	34.23	0.00076
39	21	128.02	0.0012
33	20	32	0.00074
18	8	54	0.0010
17	9	0.899	0.00017