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1 Data analysis

Following is the first simple analysis of the data. Results were obtained by running following script in ttblazer application:

```
#LOAD DATA
   loadug ../procdata/cpsk/res/ug_cpza.ug
   loadug ../procdata/cpsk/res/ug_cpru.ug
loadug ../procdata/zsr/res/ug_zsr.ug
   loadug ../procdata/london/res/ug_london.ug
   loadug ../procdata/svk/res/ug_svk.ug
loadtt -t ../procdata/cpsk/res/tt_cpza.tt
   loadtt -t ../procdata/cpsk/res/tt_cpru.tt
   loadtt -t ../procdata/zsr/res/tt_zsr.tt
10
   #ANALYSE
11
   an ugconn ug 0 -partdet
   an ugdegs ug 0 -degdet
12
13 an ugconn ug 1 -partdet
14 an ugdegs ug 1 -degdet
15 an ugconn ug 2 -partdet
16 an ugdegs ug 2 -degdet
   an ugconn ug 3 -partdet
17
18 an ugdegs ug 3 -degdet
   an ugconn ug 4 -partdet
an ugdegs ug 4 -degdet
19
20
21
   showug 0
   showug 1
23
   showug 2
   showug 3
25
   showug 4
26
   showtt 0
27
   showtt 1
   showtt 2
28
29
   quit
```

Listing 1: Script that obtained the results

Name	Type	# nodes	# arcs	Load time
ug_cpza.ug	Regional bus	1128	2034	0.4s
ug_cpru.ug	Regional bus	877	1784	0.4s
ug_zsr.ug	Country-wide rails	233	588	0.1s
ug_london.ug	Underground rails	321	732	0.1s
ug_svk.ug	Road network	181386	425829	7.754s

Table 1: Underlying graphs - main properties

Name	# nodes	# arcs	Avg deg.	Min deg.	Max deg.	Degrees	Analysis time
ug_cpza.ug	1128	2034	1.80319	0	24	0: 78x, 1: 536x, 2: 297x, 3: 115x, 4: 48x, 5: 25x, 6: 10x, 7: 7x, 8: 5x, 9: 2x, 10: 1x, 12: 1x, 14: 1x, 15: 1x, 24: 1x	0.0s
ug_cpru.ug	877	1784	2.03421	0	17	0: 54x, 1: 405x, 2: 202x, 3: 86x, 4: 55x, 5: 34x, 6: 17x, 7: 11x, 8: 3x, 9: 2x, 10: 1x, 11: 1x, 12: 1x, 13: 2x, 14: 1x, 16: 1x, 17: 1x	0.0s
ug_zsr.ug	233	588	2.52361	0	12	1: 42x, 2: 119x, 3: 28x, 4: 14x, 5: 14x, 6: 6x, 7: 3x, 8: 1x, 9: 1x, 12: 2x	0.0s
ug_london.ug	321	732	2.28037	0	7	0: 3x, 1: 25x, 2: 230x, 3: 25x, 4: 27x, 5: 5x, 6: 3x, 7: 3x	0.0s
ug_svk.ug	181386	425829	2.34764	0	6	0: 96x, 1: 46469x, 2: 34998x, 3: 90084x, 4: 9586x, 5: 150x, 6: 3x	0.25s

Table 2: Underlying graphs - degrees

Name	# nodes	# arcs	# connected	# of conn. comps	# of component sizes	Analysis time
ug_cpza.ug	1128	2034	false	21	1108, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	0.2s
ug_cpru.ug	877	1784	false	7	871, 1, 1, 1, 1, 1	0.1s
ug_zsr.ug	233	588	true	1	233	0.0s
ug_london.ug	321	732	false	4	318, 1, 1, 1	0.1s
ug_svk.ug	181386	425829	false	871	178187, 134, 105, 30, 29,	4.478s

Table 3: Underlying graphs - connectivity

ĺ	Name	Type	# el. conn.	Load time	
	tt_cpza	Regional bus	61747	4.451s	
	${ m tt_cpru}$	Regional bus	38540	2.275s	
	tt zsr	Country-wide rails	932052	66.6668s	

Table 4: Timetables - main properties

2 Open points

- \bullet Hierarchy of express lines \to what properties can be propagated in time-expansion?
- \bullet Instant cost function more formal and details

3 To do

- Road network of SVK process data \checkmark
- United airlines extract data
- Continue the diagnostic program
- Properties propagation in simple timetables
- Machine learning