Appendix A: DLP Model

$$\text{[DLP] minimize} \quad \sum_{j \in N} (f(y_j) + g(z_j)) \tag{1}$$

$$\text{s.t. } z_j \leq C y_j \qquad j \in N \tag{2}$$

$$\sum_{j:(i,j)\in A_k} x_{ijk} - \sum_{j:(j,i)\in A_k} x_{jik} = \begin{cases} 1, & \text{if } i = O_k, \\ -1, & \text{if } i = D_k, \\ 0, & \textit{otherwise.} \end{cases} \qquad i \in N_k, \quad k \in K \tag{8}$$

$$\sum_{i:(i,j)\in A_k} x_{ijk} \leq y_j \qquad j \in N_k, \quad j \neq D_k, \quad k \in K \tag{9}$$

$$\sum_{(i,j)\in A_k} \delta_{ij} x_{ijk} \leq (1+\tau)\delta_{O_k D_k} \qquad k \in K \tag{10}$$

$$\theta_{ik} - \theta_{D_k k} + \delta_{iD_k}\phi_k \leq \delta_{iD_k} \qquad k \in K,\ (i, D_k) \in A_k \tag{13}$$

$$\theta_{ik} - \theta_{jk} + \gamma_{jk} + \delta_{ij}\phi_k \leq \delta_{ij} \qquad k \in K,\ (i,j) \in A_k,\ j \neq D_k \tag{14}$$

$$\sum_{(i,j)\in A_k} \delta_{ij} x_{ijk} = (\theta_{O_k k} - \theta_{D_k k}) + \sum_{j \in N_k} q_{jk} + \delta_{O_k D_k}(1+\tau)\phi_k \qquad k \in K \tag{18}$$

$$q_{jk} \geq \overline{\gamma}_{jk} y_j \qquad j \in N_k, k \in K \tag{19}$$

$$q_{jk} \geq \gamma_{jk} \qquad j \in N_k, k \in K \tag{20}$$

$$q_{jk} \leq \gamma_{jk} - (1 - y_j)\overline{\gamma}_{jk} \qquad j \in N_k, k \in K \tag{21}$$

$$\Lambda_j = \sum_{i:(i,j)\in A} \sum_{k \in K} \lambda_k x_{ijk} \qquad j \in N \tag{23}$$

$$\Lambda_j \leq \mu z_j - \epsilon \qquad j \in N \tag{24}$$

$$\sum_{m=1}^{C} s_{jm} = 1 \qquad j \in N \tag{27}$$

$$\Lambda_j \leq \sum_{m=1}^{C} b_m s_{jm} \qquad j \in N \tag{28}$$

$$\Lambda_j \geq \sum_{m=2}^{C} b_{m-1} s_{jm} \qquad j \in N \tag{29}$$

$$z_j \geq \sum_{m=1}^{C} m s_{jm} \qquad j \in N \tag{30}$$

$$y_j \in \{0,1\} \qquad j \in N \tag{4}$$

$$z_j \geq 0 \text{ and integer} \qquad j \in N \tag{5}$$

$$x_{ijk} \in \{0,1\} \qquad (i,j) \in A_k, \quad k \in K \tag{11}$$

$$\theta_{jk} \text{ free} \qquad j \in N_k,\ k \in K \tag{15}$$

$$\gamma_{jk} \leq 0 \qquad j \in N_k,\ k \in K \tag{16}$$

$$\phi_k \leq 0 \qquad k \in K \tag{17}$$

$$q_{jk} \leq 0 \qquad j \in N_k, k \in K \tag{22}$$

$$s_{jm} \in \{0,1\} \qquad j \in N,\ m \in \{1,2,...,C\} \tag{31}$$

Appendix B: Detailed Computational Results

Table 1 N25 Results under Cooperative EV User Response

Configuration			$R=15$							$R=20$							$R=25$						
Dev Tol	β	**α (min)**	$\sum y$	$\sum z$	**Obj ($Mil)**	**Avg Dev(%)**	**Max Dev(%)**	**Gurobi Time(s)**	**Algo Sol Time(s)**	$\sum y$	$\sum z$	**Obj ($Mil)**	**Avg Dev(%)**	**Max Dev(%)**	**Gurobi Time(s)**	**Algo Sol Time(s)**	$\sum y$	$\sum z$	**Obj ($Mil)**	**Avg Dev(%)**	**Max Dev(%)**	**Gurobi Time(s)**	**Algo Sol Time(s)**
0%	95%	30	8	125	10.575	-	-	1.80	6.03	5	67	5.775	-	-	0.56	4.68	3	32	2.85	-	-	0.47	2.44
		10	8	141	11.775	-	-	4.48	5.48	5	76	6.45	-	-	1.21	4.08	3	36	3.15	-	-	0.53	2.44
		5	8	149	12.375	-	-	2.09	5.49	5	80	6.75	-	-	1.47	4.16	3	38	3.30	-	-	0.29	2.37
		1	8	159	13.125	-	-	2.10	5.41	5	86	7.20	-	-	1.21	4.27	3	40	3.45	-	-	0.43	2.41
	90%	30	8	122	10.35	-	-	2.62	5.86	5	65	5.625	-	-	1.61	4.66	3	31	2.775	-	-	0.27	2.36
		10	8	134	11.25	-	-	2.91	6.54	5	72	6.15	-	-	0.90	4.04	3	34	3.00	-	-	0.55	2.32
		5	8	141	11.775	-	-	1.86	5.90	5	76	6.45	-	-	2.19	4.08	3	36	3.15	-	-	0.32	2.35
		1	8	150	12.45	-	-	1.57	5.78	5	80	6.75	-	-	1.43	4.24	3	38	3.30	-	-	0.39	2.36
	80%	30	8	118	10.05	-	-	2.62	6.23	5	62	5.40	-	-	1.09	4.97	3	30	2.70	-	-	0.55	2.36
		10	8	127	10.725	-	-	1.92	5.95	5	68	5.85	-	-	0.86	4.09	3	32	2.85	-	-	0.47	2.34
		5	8	132	11.10	-	-	1.76	5.37	5	71	6.075	-	-	1.62	4.12	3	34	3.00	-	-	0.64	2.48
		1	8	139	11.625	-	-	1.90	5.53	5	74	6.30	-	-	1.66	4.30	3	35	3.075	-	-	0.29	2.35
10%	95%	30	8	125	10.575	0	0	37.63	5.73	5	67	5.775	0	0	3.32	5.08	3	32	2.85	0	0	1.00	2.35
		10	8	141	11.775	0	0	79.01	5.21	5	76	6.45	0	0	13.12	4.03	3	36	3.15	0	0	1.71	2.36
		5	8	149	12.375	0	0	64.78	5.31	5	80	6.75	0	0	23.86	4.12	3	38	3.30	0	0	1.02	2.36
		1	8	159	13.125	0	0	57.49	5.17	5	86	7.20	0	0	50.26	4.20	3	40	3.45	0	0	0.87	2.35
	90%	30	8	122	10.35	0	0	70.88	5.56	5	65	5.625	0	0	4.47	4.51	3	31	2.775	0	0	0.90	2.33
		10	8	134	11.25	0	0	54.89	5.85	5	72	6.15	0	0	8.46	4.13	3	34	3.00	0	0	1.34	2.33
		5	8	141	11.775	0	0	53.86	5.60	5	76	6.45	0	0	39.63	4.01	3	36	3.15	0	0	1.22	2.35
		1	8	150	12.45	0	0	96.37	5.48	5	80	6.75	0	0	43.98	4.16	3	38	3.30	0	0	1.66	2.34
	80%	30	8	118	10.05	0	0	30.36	5.64	5	62	5.40	0	0	5.92	5.24	3	30	2.70	0	0	0.79	2.31
		10	8	127	10.725	0	0	54.77	5.42	5	68	5.85	0	0	31.09	3.96	3	32	2.85	0	0	1.46	2.30
		5	8	132	11.10	0	0	60.02	5.10	5	71	6.075	0	0	7.84	4.10	3	34	3.00	0	0	1.59	2.39
		1	8	139	11.625	0	0	46.81	5.34	5	74	6.30	0	0	39.12	4.28	3	35	3.075	0	0	1.18	2.33
25%	95%	30	6	123	10.125	1.74	21.43	260.32	4.07	3	63	5.175	2.44	22.22	42.43	2.80	2	31	2.625	0.6	13.04	5.21	1.88
		10	6	135	11.025	1.74	21.43	432.03	4.03	3	70	5.70	1.49	16.67	10.94	2.83	2	34	2.85	0.6	13.04	7.55	1.85
		5	6	143	11.625	1.74	21.43	519.97	4.06	3	74	6.00	1.49	16.67	50.22	2.82	2	36	3.00	1.78	22.73	6.31	1.87
		1	6	152	12.30	1.74	21.43	437.18	4.12	3	79	6.375	1.49	16.67	24.17	2.83	2	38	3.15	0.45	13.04	37.06	1.86
	90%	30	6	119	9.825	1.74	21.43	186.63	4.05	3	62	5.10	2.44	22.22	11.05	2.84	2	30	2.55	0.46	13.04	6.99	1.86
		10	6	130	10.65	1.74	21.43	312.39	4.05	3	67	5.475	2.44	22.22	19.67	2.90	2	32	2.70	0.45	13.04	5.60	1.84
		5	6	136	11.10	1.74	21.43	340.21	4.03	3	70	5.70	2.44	22.22	34.66	3.00	2	34	2.85	0.45	13.04	6.12	1.86
		1	6	145	11.775	1.74	21.43	757.12	4.12	3	75	6.075	2.44	22.22	106.45	2.82	2	36	3.00	0.46	13.04	5.22	1.90
	80%	30	6	116	9.60	1.74	21.43	119.71	4.13	3	60	4.95	2.44	22.22	10.91	2.85	2	29	2.475	0.45	13.04	9.76	1.88
		10	6	124	10.20	1.74	21.43	242.59	4.09	3	64	5.25	1.49	16.67	12.98	2.85	2	31	2.625	0.23	13.04	6.00	1.85
		5	6	129	10.575	1.74	21.43	295.89	4.14	3	67	5.475	2.44	22.22	14.63	2.81	2	32	2.70	0.45	13.04	7.34	1.87
		1	6	135	11.025	1.74	21.43	287.59	4.00	3	70	5.70	1.49	22.22	11.18	2.85	2	34	2.85	0.45	13.04	6.67	1.85
50%	95%	30	5	121	9.825	4.12	38.46	490.50	3.76	2	63	5.025	5.67	44.44	6.66	2.34	2	30	2.55	3.85	39.13	19.49	1.67
		10	5	133	10.725	4.12	38.46	837.50	3.75	2	69	5.475	5.67	44.44	7.58	2.30	2	34	2.85	0.46	13.04	15.01	1.67
		5	5	140	11.25	4.12	38.46	1109.32	3.72	2	72	5.70	5.67	44.44	5.66	2.29	2	36	3.00	0.46	13.04	26.24	1.67
		1	5	149	11.925	4.12	38.46	1346.00	3.79	2	77	6.075	5.67	44.44	6.59	2.29	2	38	3.15	2.91	30.43	59.52	1.68
	90%	30	5	119	9.675	4.12	38.46	1487.53	3.72	2	62	4.95	5.67	44.44	4.59	2.28	2	30	2.55	1.78	22.73	21.67	1.67
		10	5	128	10.35	4.12	38.46	693.80	3.75	2	67	5.325	5.67	44.44	5.35	2.32	2	32	2.70	2.91	30.43	25.28	1.71
		5	5	134	10.80	4.12	38.46	1426.74	3.73	2	70	5.55	5.67	44.44	10.20	2.33	2	34	2.85	0.23	13.04	70.60	1.68
		1	5	142	11.40	4.12	38.46	1275.94	3.77	2	73	5.775	5.67	44.44	13.89	2.31	2	36	3.00	1.87	26.09	72.84	1.68
	80%	30	5	116	9.45	4.12	38.46	519.05	3.72	2	61	4.875	5.67	44.44	5.23	2.31	2	29	2.475	0.46	13.04	181.38	1.67
		10	5	123	9.975	5.58	46.15	1630.67	3.78	2	65	5.175	5.67	44.44	10.22	2.30	2	31	2.625	0.46	13.04	16.77	1.68
		5	5	127	10.275	4.12	38.46	802.30	3.73	2	67	5.325	5.67	44.44	5.99	2.32	2	32	2.70	0.46	13.04	81.06	1.67
		1	5	133	10.725	4.12	38.46	935.82	3.73	2	70	5.55	5.67	44.44	7.53	2.31	2	34	2.85	0.45	13.04	61.61	1.67

Table 2 Algorithm Results on CA339 Instances under Cooperative EV User Response

Configuration										
R	**Dev Tol**	**α (min)**	$\sum y$	$\sum z$	**Obj ($Mil)**	**Avg Dev(%)**	**Max Dev(%)**	**# Cuts** (41), (42)	**# Cuts** (43)	**Iterations -# Cuts** (48)-
250	0%	30	4	190	14.85	-	-	762	0	2175
		10	4	198	15.45	-	-	762	0	2229
		5	4	204	15.90	-	-	762	0	2233
		1	4	214	16.65	-	-	762	0	2233
	10%	30	3	180	13.95	0.79	5.02	1132	0	2167
		10	3	187	14.475	0.79	5.02	1132	0	2167
		5	3	192	14.85	0.66	9.22	1130	0	2132
		1	3	201	15.525	0.79	5.02	1090	0	2032
	25%	30	2	178	13.65	0.88	20.60	4388	0	1709
		10	2	184	14.10	0.88	20.60	4388	0	1767
		5	2	188	14.40	0.88	20.60	4388	0	1770
		1	2	198	15.15	0.77	23.43	4388	0	1710
	50%	30	2	178	13.65	0.88	20.60	9870	0	1593
		10	2	184	14.10	0.88	20.60	9870	0	1592
		5	2	188	14.40	0.88	20.60	9870	0	1587
		1	2	198	15.15	0.88	20.60	9870	0	1588
200	0%	30	7	330	25.80	-	-	1030	0	2491
		10	7	345	26.925	-	-	1030	0	2490
		5	7	356	27.75	-	-	1030	0	2488
		1	7	374	29.10	-	-	1030	0	2492
	10%	30	5	319	24.675	1.01	9.54	1470	16	2446
		10	5	328	25.35	0.97	9.54	1470	16	2434
		5	5	336	25.95	1.01	9.54	1470	16	2389
		1	5	351	27.075	1.01	9.54	1470	16	2270
	25%	30	3	319	24.375	2.38	22.68	2510	0	2309
		10	3	327	24.975	2.38	22.68	2510	0	2231
		5	3	334	25.50	1.77	22.29	2510	0	2247
		1	3	348	26.55	1.90	22.29	2510	0	2257
	50%	30	3	310	23.70	3.35	40.94	11,692	0	1309
		10	3	318	24.30	7.07	49.35	11,692	0	1342
		5	3	326	24.90	7.78	49.35	11,692	0	1215
		1	3	339	25.875	7.07	49.35	11,692	0	1380

Table 3 Algorithm Results on US-E420 Instances under Cooperative EV User Response

Configuration			Cooperative							
R	**Dev Tol**	**α (min)**	$\sum y$	$\sum z$	**Obj ($Mil)**	**Avg Dev(%)**	**Max Dev(%)**	**# Cuts** (41), (42)	**# Cuts** (43)	**Iterations -# Cuts** (48)-
600	0%	30	55	586	52.20	-	-	1264	0	2126
		10	55	653	57.225	-	-	1264	0	2119
		5	55	693	60.225	-	-	1264	0	2129
		1	55	734	63.30	-	-	1264	0	2120
	10%	30	39	548	46.95	1.41	9.57	1166	0	2710
		10	39	606	51.30	1.42	9.57	1166	0	2705
		5	39	638	53.70	1.42	9.57	1166	0	2712
		1	39	673	56.325	1.41	9.57	1166	0	2705
	25%	30	31	535	44.775	5.89	24.72	2674	585	1117
		10	31	585	48.525	5.92	24.72	2674	585	1116
		5	31	613	50.625	5.80	24.31	2674	585	1117
		1	31	652	53.55	5.80	24.72	2674	585	1043
	50%	30	25	536	43.95	9.08	48.29	8732	315	62
		10	25	583	47.475	9.08	48.29	8720	304	58
		5	25	606	49.20	9.08	48.29	8732	304	60
		1	25	648	52.35	9.08	48.29	8732	304	59
400	0%	30	97	1009	90.225	-	-	1852	0	1826
		10	97	1130	99.30	-	-	1852	0	1760
		5	97	1196	104.25	-	-	1852	0	1916
		1	97	1270	109.80	-	-	1852	0	1903
	10%	30	79	984	85.65	1.86	9.56	2132	134	1435
		10	79	1089	93.525	1.96	9.60	2132	134	1450
		5	79	1142	97.50	2.07	9.85	2132	134	1458
		1	79	1218	103.20	1.86	9.56	2132	134	1513
	25%	30	65	974	82.80	6.12	24.62	4934	1488	71
		10	65	1068	89.85	6.12	24.62	4930	1444	66
		5	65	1119	93.675	6.12	24.62	4934	1488	71
		1	65	1188	98.85	6.12	24.62	4930	1451	67
	50%	30	51	999	82.575	13.0	49.52	14,072	678	1
		10	51	1085	89.025	13.0	49.52	14,072	678	1
		5	51	1137	92.925	13.0	49.52	14,072	678	1
		1	51	1203	97.875	13.0	49.52	14,072	678	1

Table 4 Comparison of Solution Quality and Computation Time for Varying Variable Charging Stall Cost

Configuration		stall=$75,000		stall=$100,000		stall=$150,000		stall=$200,000		stall=$300,000	
R	Dev Tol	Mean Gap(%)	Mean Gurobi Time(s)	Mean Gap(%)	Mean Gurobi Time(s)	Mean Gap(%)	Mean Gurobi Time(s)	Mean Gap(%)	Mean Gurobi Time(s)	Mean Gap(%)	Mean Gurobi Time(s)
15	0%	0	2.3	0	5.8	0	4.6	0	37.2	0	10.9
	10%	0	58.9	0.03	129.3	0.07	64.4	0.13	590.2	0.20	242.2
	25%	0	349.3	0.16	571.4	0.32	630.3	0.45	1682.0	0.53	1927.7
	50%	0	1046.3	0.06	1438.8	0.06	1071.1	0.05	2418.7	0.09	2965.9
20	0%	0	1.3	0	2.0	0	1.5	0	15.9	0	2.3
	10%	0	22.6	0	23.6	0	24.7	0	196.1	0	60.2
	25%	0	29.1	0	67.0	0	45.1	0	101.5	0	94.1
	50%	0	7.5	0	15.0	0	11.4	0	71.7	0	78.4
25	0%	0	0.4	0	0.5	0	0.4	0	1.0	0	0.6
	10%	0	1.2	0	1.9	0	1.3	0	4.3	0	2.5
	25%	0	9.2	0	7.7	0	7.1	0	18.5	0	15.1
	50%	0	54.3	0	53.9	0	56.6	0	75.3	0	81.6
	Avg:	**0.00**	**131.9**	**0.02**	**190.6**	**0.04**	**159.9**	**0.05**	**434.4**	**0.07**	**456.8**

Table 5 N25 Results under Cooperative and Uncooperative EV User Response

Configuration				Cooperative				Uncooperative				Difference			
R	Dev Tol	β	α (min)	$\sum y$	$\sum z$	Obj ($Mil)	Avg Dev(%)	$\sum y$	$\sum z$	Obj ($Mil)	Avg Dev(%)	$\sum y$	$\sum z$	Obj ($Mil)	Avg Dev(%)
15	0%	90%	30	8	122	10.35	-	8	128	10.80	-	0	+6	4.35	-
			10	8	134	11.25	-	8	141	11.775	-	0	+7	4.67	-
			1	8	150	12.45	-	8	157	12.975	-	0	+7	4.22	-
		80%	30	8	118	10.05	-	8	124	10.50	-	0	+6	4.48	-
			10	8	127	10.725	-	8	133	11.175	-	0	+6	4.20	-
			1	8	139	11.625	-	8	146	12.15	-	0	+7	4.52	-
	10%	90%	30	8	122	10.35	0.00	8	128	10.80	0.00	0	+6	4.35	0.00
			10	8	134	11.25	0.00	8	141	11.775	0.00	0	+7	4.67	0.00
			1	8	150	12.45	0.00	8	157	12.975	0.00	0	+7	4.22	0.00
		80%	30	8	118	10.05	0.00	8	124	10.50	0.00	0	+6	4.48	0.00
			10	8	127	10.725	0.00	8	133	11.175	0.00	0	+6	4.20	0.00
			1	8	139	11.325	0.00	8	146	12.15	0.00	0	+7	4.52	0.00
	25%	90%	30	6	119	9.825	1.74	6	123	10.125	1.74	0	+4	3.05	0.00
			10	6	130	10.65	1.74	6	134	10.95	1.74	0	+4	2.82	0.00
			1	6	145	11.775	1.74	6	150	12.15	1.74	0	+5	3.18	0.00
		80%	30	6	116	9.60	1.74	6	120	9.90	1.74	0	+4	3.13	0.00
			10	6	124	10.20	1.74	6	128	10.50	1.74	0	+4	2.94	0.00
			1	6	135	11.025	1.74	6	140	11.40	1.74	0	+5	3.40	0.00
	50%	90%	30	5	119	9.675	5.58	5	121	9.825	4.12	0	+2	1.55	-1.46
			10	5	128	10.35	5.58	5	131	10.575	4.12	0	+3	2.17	-1.46
			1	5	142	11.40	5.58	5	145	11.625	4.12	0	+3	1.97	-1.46
		80%	30	5	116	9.45	5.58	5	119	9.675	3.97	0	+3	2.38	-1.61
			10	5	123	9.975	5.58	5	125	10.125	4.12	0	+2	1.50	-1.46
			1	5	133	10.725	4.12	5	137	11.025	4.12	0	+4	2.80	0.00
20	0%	90%	30	5	65	5.625	-	5	69	5.925	-	0	+4	5.33	-
			10	5	72	6.15	-	5	77	6.525	-	0	+5	6.10	-
			1	5	80	6.75	-	5	86	7.20	-	0	+6	6.67	-
		80%	30	5	62	5.40	-	5	67	5.775	-	0	+5	6.94	-
			10	5	68	5.85	-	5	72	6.15	-	0	+4	5.13	-
			1	5	74	6.30	-	5	79	6.675	-	0	+5	5.95	-
	10%	90%	30	5	65	5.625	0.00	5	69	5.925	0.00	0	+4	5.33	0.00
			10	5	72	6.15	0.00	5	77	6.525	0.00	0	+5	6.10	0.00
			1	5	80	6.75	0.00	5	85	7.125	0.00	0	+5	5.56	+0.30
		80%	30	5	62	5.40	0.00	5	67	5.775	0.00	0	+5	6.94	0.00
			10	5	68	5.85	0.00	5	72	6.15	0.00	0	+4	5.13	0.00
			1	5	74	6.30	0.00	5	79	6.675	0.00	0	+5	5.95	0.00
	25%	90%	30	3	62	5.10	1.49	3	64	5.25	1.49	0	+2	2.94	0.00
			10	3	67	5.475	1.49	3	69	5.625	1.49	0	+2	2.74	0.00
			1	3	75	6.075	1.49	3	77	6.225	1.49	0	+2	2.47	0.00
		80%	30	3	60	4.95	1.49	3	62	5.10	1.49	0	+2	3.03	0.00
			10	3	64	5.25	1.49	3	66	5.40	1.49	0	+2	2.86	0.00
			1	3	70	5.70	1.49	3	72	5.85	1.49	0	+2	2.63	0.00
	50%	90%	30	2	62	4.95	5.67	2	62	4.95	5.67	0	0	0.00	0.00
			10	2	67	5.325	5.67	2	67	5.325	5.67	0	0	0.00	0.00
			1	2	73	5.775	5.67	2	73	5.775	5.67	0	0	0.00	0.00
		80%	30	2	61	4.875	5.67	2	61	4.875	5.67	0	0	0.00	0.00
			10	2	65	5.175	5.67	2	65	5.175	5.67	0	0	0.00	0.00
			1	2	70	5.55	5.67	2	70	5.55	5.67	0	0	0.00	0.00
25	0%	90%	30	3	31	2.775	-	3	32	2.85	-	0	+1	2.70	-
			10	3	34	3.00	-	3	36	3.15	-	0	+2	5.00	-
			1	3	38	3.30	-	3	39	3.375	-	0	+1	2.27	-
		80%	30	3	30	2.70	-	3	31	2.775	-	0	+1	2.78	-
			10	3	32	2.85	-	3	33	2.925	-	0	+1	2.63	-
			1	3	35	3.075	-	3	37	3.225	-	0	+2	4.88	-
	10%	90%	30	3	31	2.775	0.15	3	32	2.85	0.00	0	+1	2.70	-0.15
			10	3	34	3.00	0.15	3	36	3.15	0.00	0	+2	5.00	-0.15
			1	3	38	3.30	0.15	3	39	3.375	0.00	0	+1	2.27	-0.15
		80%	30	3	30	2.70	0.15	3	31	2.775	0.00	0	+1	2.78	-0.15
			10	3	32	2.85	0.15	3	33	2.925	0.00	0	+1	2.63	-0.15
			1	3	35	3.075	0.15	3	37	3.225	0.00	0	+2	4.88	-0.15
	25%	90%	30	2	30	2.55	0.46	2	30	2.55	1.78	0	0	0.00	+1.32
			10	2	32	2.70	0.45	2	32	2.70	1.78	0	0	0.00	+1.33
			1	2	36	3.00	0.45	2	36	3.00	1.78	0	0	0.00	+1.33
		80%	30	2	29	2.475	0.46	2	29	2.475	0.45	0	0	0.00	-0.01
			10	2	31	2.625	0.46	2	31	2.625	1.78	0	0	0.00	+1.32
			1	2	34	2.85	0.46	2	34	2.85	1.78	0	0	0.00	+1.32
	50%	90%	30	2	30	2.55	5.78	2	30	2.55	1.78	0	0	0.00	-4.00
			10	2	32	2.70	2.91	2	32	2.70	1.78	0	0	0.00	-1.13
			1	2	36	3.00	1.87	2	36	3.00	1.78	0	0	0.00	-0.09
		80%	30	2	29	2.475	5.78	2	29	2.475	0.45	0	0	0.00	-5.33
			10	2	31	2.625	5.78	2	31	2.625	1.78	0	0	0.00	-4.00
			1	2	34	2.85	1.87	2	34	2.85	1.78	0	0	0.00	-0.09

Appendix C: Additional Figures

Figure 1 **Small benchmark network N25 (left) and California road network CA339 (right)**

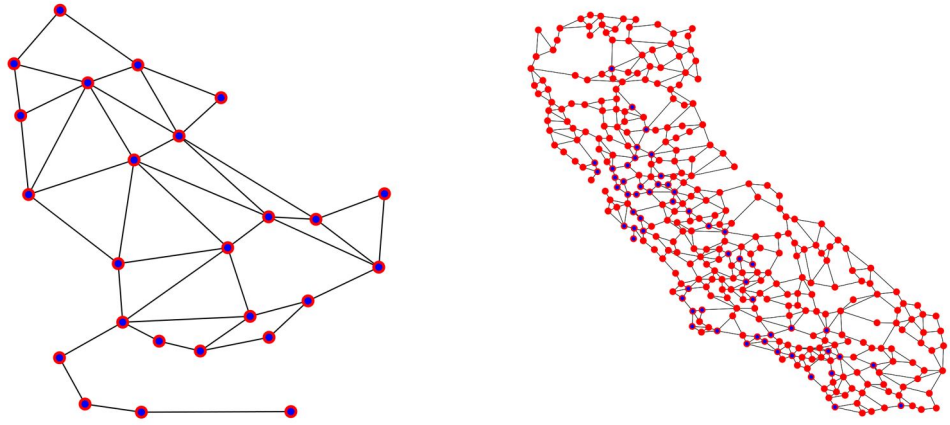


Figure 2 **Eastern United States highway networks: raw US-E (left) and simplified US-E420 (right)**

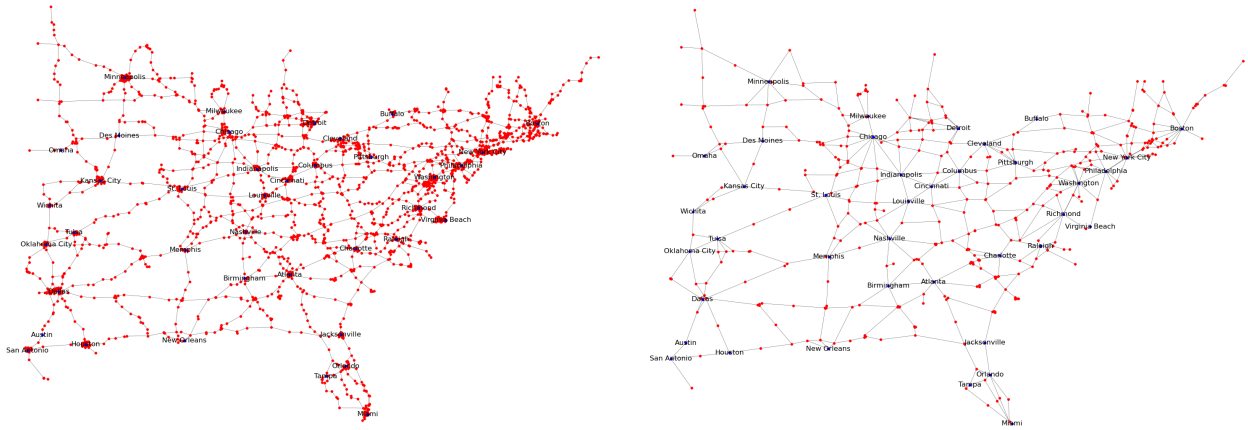


Figure 3 **Average Solution Time Comparison for N25 instances**

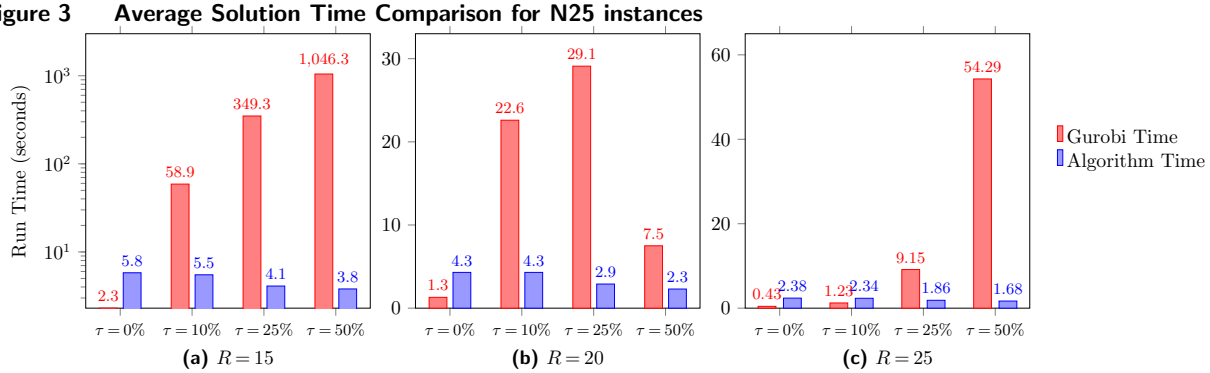
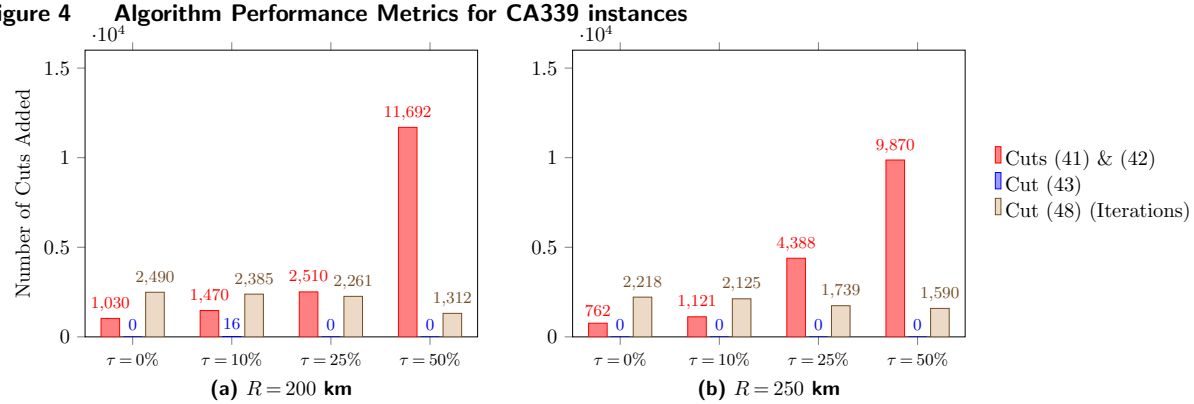
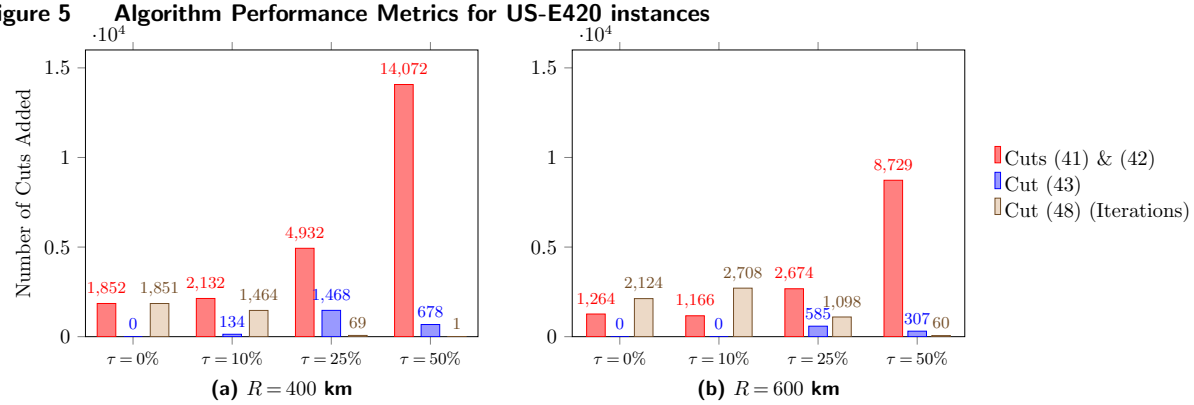


Figure 4 **Algorithm Performance Metrics for CA339 instances**



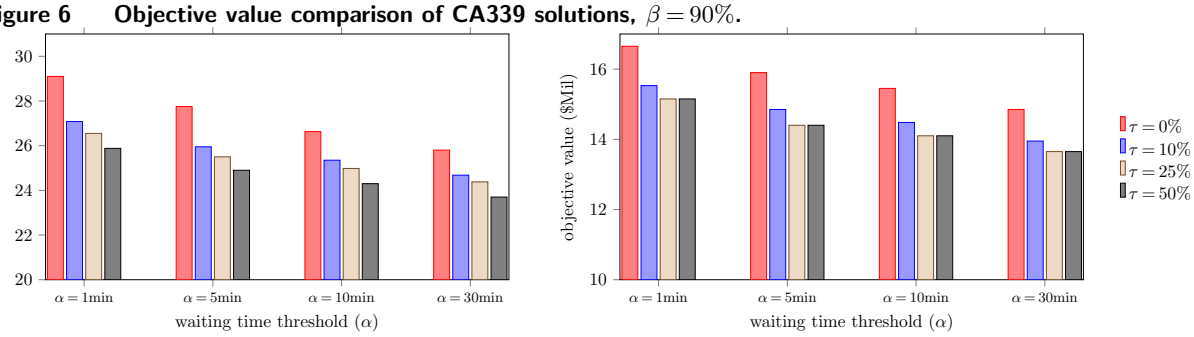
(a) $R = 200$ **km** **(b)** $R = 250$ **km**

Figure 5 **Algorithm Performance Metrics for US-E420 instances**



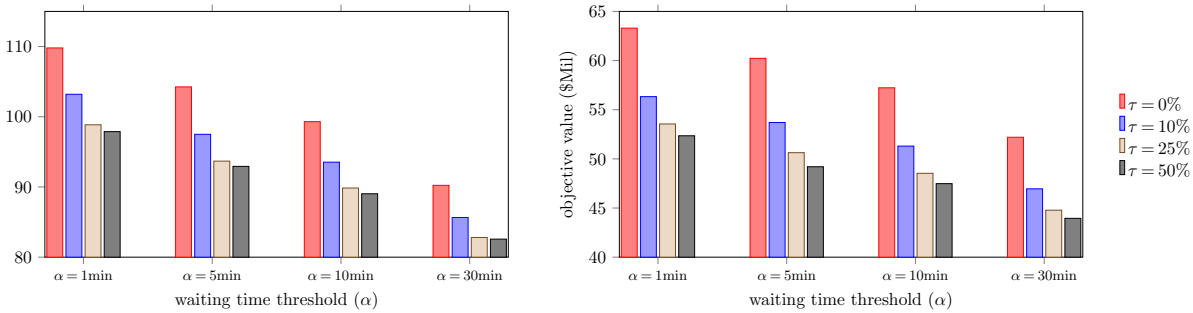
(a) $R = 400$ **km** **(b)** $R = 600$ **km**

Figure 6 **Objective value comparison of CA339 solutions,** $\beta = 90\%$.



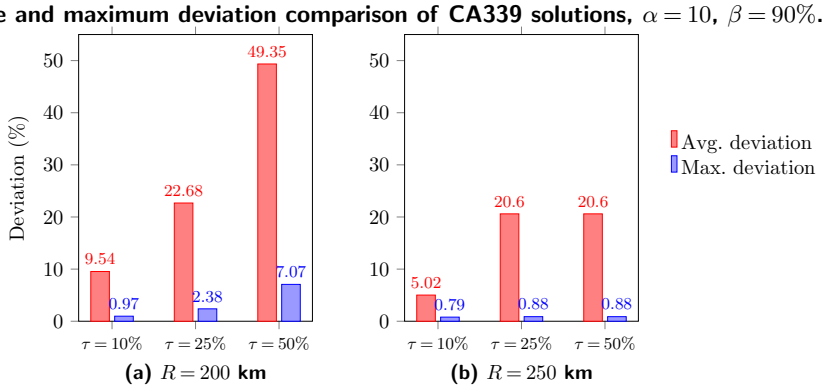
(a) $R = 200$ **km** **(b)** $R = 250$ **km**

Figure 8 **Objective value comparison of US-E420 solutions,** $\beta = 90\%$.



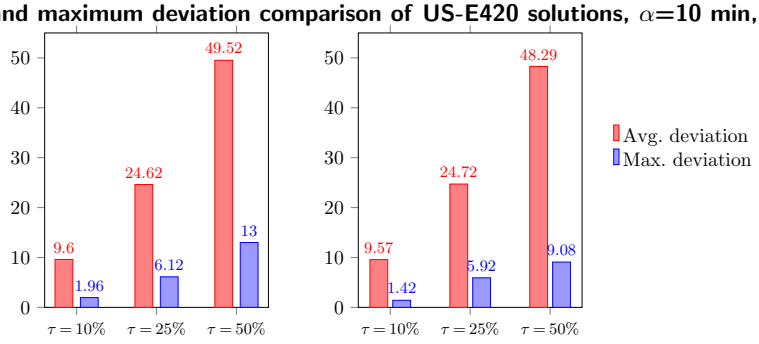
(a) $R = 400$ **km** **(b)** $R = 600$ **km**

Figure 7 **Average and maximum deviation comparison of CA339 solutions,** $\alpha = 10$, $\beta = 90\%$.



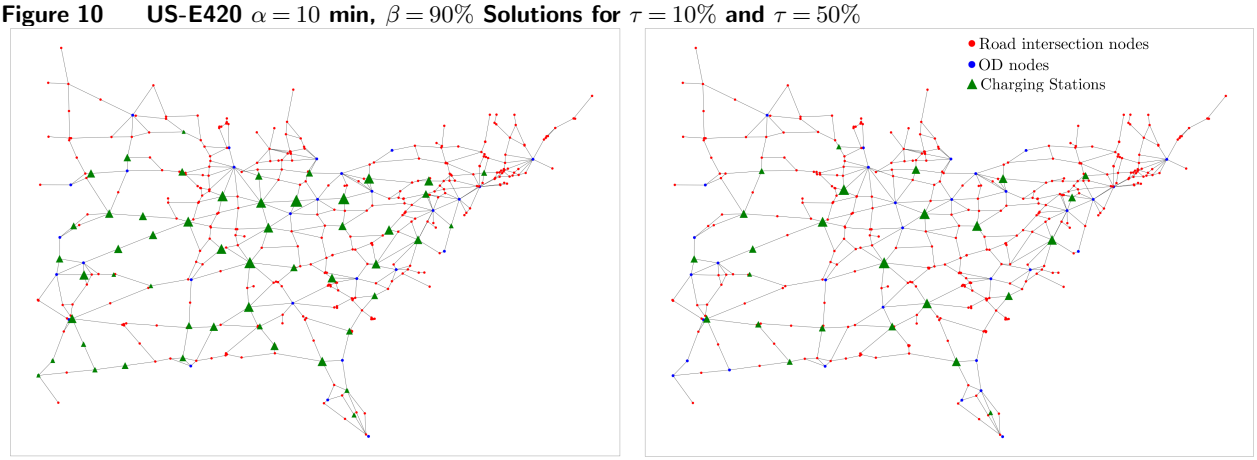
(a) $R = 200$ **km** **(b)** $R = 250$ **km**

Figure 9 **Average and maximum deviation comparison of US-E420 solutions,** α**=10 min,** $\beta = 90\%$.



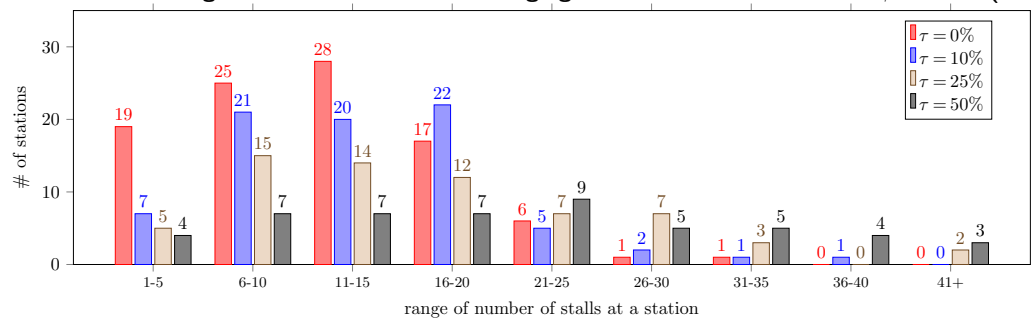
(a) $R = 400$ **km** **(b)** $R = 600$ **km**

Figure 10 **US-E420** $\alpha = 10$ **min,** $\beta = 90\%$ **Solutions for** $\tau = 10\%$ **and** $\tau = 50\%$

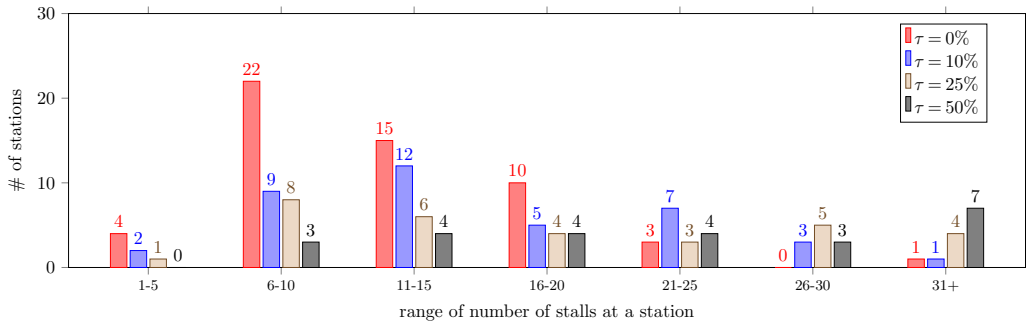


(a) $\tau = 10\%$ **(b)** $\tau = 50\%$

Figure 11 **Deviation histograms for the number of charging stalls installed,** $\alpha = 10$ **min,** $\beta = 90\%$**, (US-E420).**

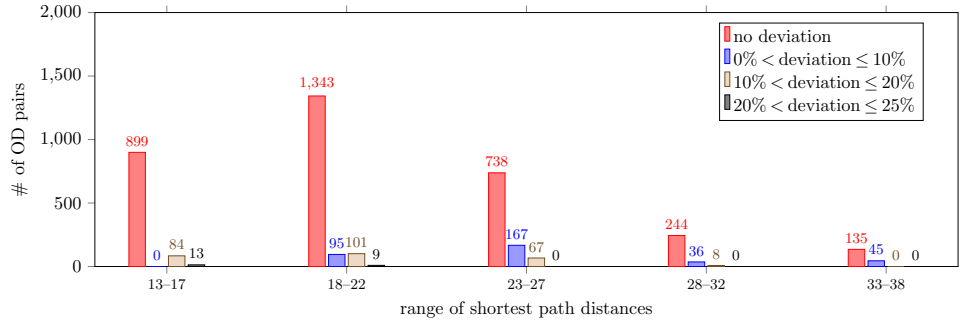


(a) $R = 400$ **km**

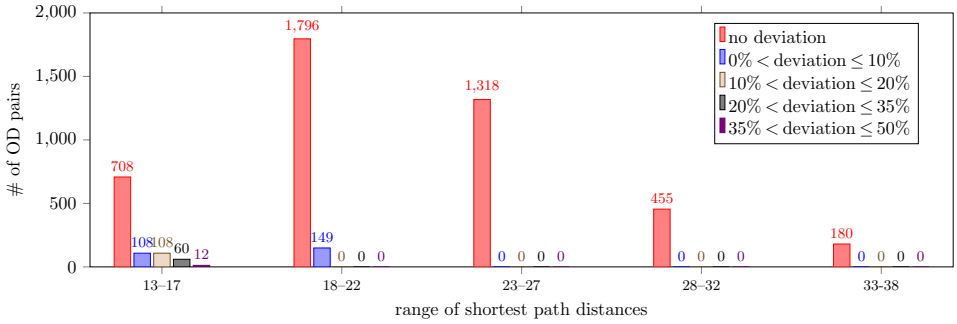


(b) $R = 600$ **km**

Figure 12 **Histograms for evaluating the impact of deviation tolerance on the type of OD pairs affected with respect to shortest path distance, (N25).**

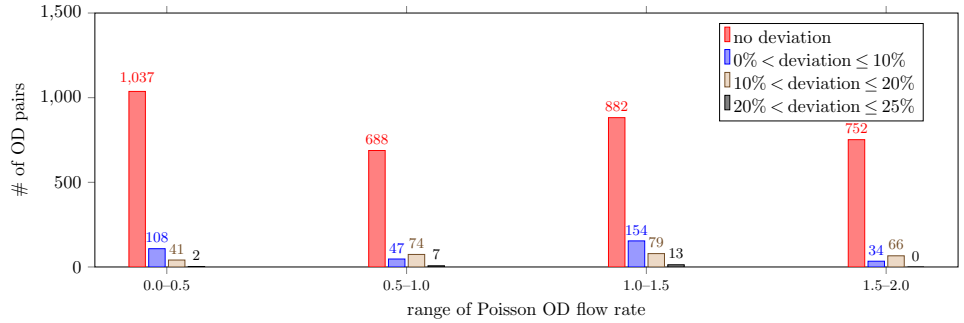


(a) $\tau = 25\%$

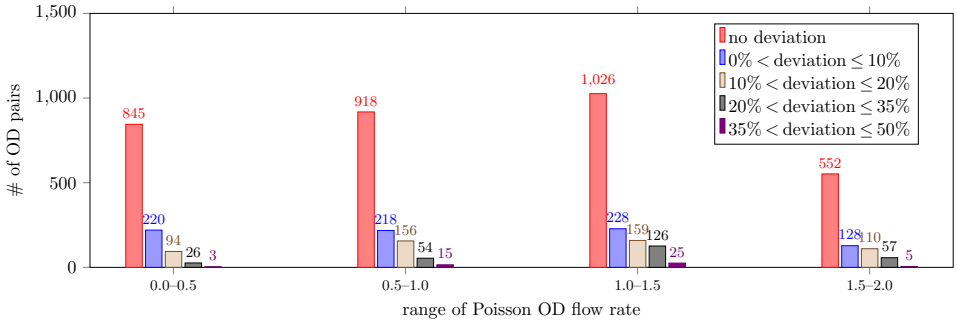


(b) $\tau = 50\%$

Figure 13 **Histograms for evaluating the impact of deviation tolerance on the type of OD pairs affected with respect to OD flow rate, (N25).**



(a) $\tau = 25\%$



(b) $\tau = 50\%$

Appendix D: Algorithm Pseudocodes

Algorithm 1 The exact LBBA for the location problem P_L

Initialization $\rightarrow$ SP_k is infeasible
while SP_k is infeasible **do**
  SOLVE MP to obtain $\overline{\mathbf{y}}$
  for $k \in K$ **do**
    SOLVE SP_k by a labeling algorithm on G_k^r to obtain $\overline{\mathbf{x}}$
    if SP_k is infeasible due to constraint (36) **then**
      SET $\mathcal{N}_f$ and $\mathcal{N}_b$
      ADD (41) and (42) to MP
    else if SP_k is feasible but constraint (10) is violated **then**
      ADD (43) to MP
    end if
  end for
  if all SP_k are feasible and (10) is satisfied **then**
    RETURN optimal solution as $(\overline{\mathbf{y}}, \overline{\mathbf{x}})$
    BREAK while
  end if
end while

Algorithm 2 Decomposition Based Algorithm (DA) for DLP

$Incumbent \leftarrow +\infty$
while time or iteration limit is not reached **do**
  OBTAIN $\overline{\mathbf{y}}$ using LBBA
  SET $\Psi_k(\overline{\mathbf{y}})$ for each $k \in K$ by a k-shortest path algorithm on G_k^r
  SOLVE P_S to obtain $\overline{\mathbf{u}}$ and $\overline{\mathbf{z}}$
  SET $\overline{\mathbf{x}}$ based on $\overline{\mathbf{u}}$
  $tempObjective \leftarrow$ (1) for $\overline{\mathbf{y}}$ and $\overline{\mathbf{z}}$
  if $tempObjective < Incumbent$ **then**
    $Incumbent \leftarrow tempObjective$, $\mathbf{y}^* := \overline{\mathbf{y}}$, $\mathbf{x}^* := \overline{\mathbf{x}}$ and $\mathbf{z}^* := \overline{\mathbf{z}}$
  end if
  ADD (48) to MP
end while
RETURN *Incumbent* and $(\mathbf{y}^*, \mathbf{x}^*, \mathbf{z}^*)$