Some Corrections to the Foundations of Combinatorial Optimization

1. p.7, l.5, change “a’_{36} ≠ 0” to “a’_{37} ≠ 0”.

2. p.11, in Theorem (Greedy characterization of matroids), define a base of an independence system to be a maximal independent set.

3. p.17, l.12, change “R^{E(G)}” to “R^{E(M)}”.

4. p.21, l.10, “notice that J + e contains a unique circuit”.

5. p.21, last line, “by noting that α = 0 would imply F(T) = P_{I(M)}, and α < 0 would imply T = ∅.”

6. p.24, Bellman-Ford Algorithm, step 2, I think you must state “f_k(w) := min\{f_{k-1}(w)\} ∪ \{f_{k-1}(\delta_e) + c(e) : e ∈ δ^-(w)\}”.

7. p.26, l.5 from the bottom, “At any stage of the algorithm”.

8. p.28, try to clarify the statement, “It cannot be that w* must be used by such an F’ before the last interior vertex j, because (a) implies that there is a minimum-weight v-j dipath that does not use w*.”

9. p.29, Knapsack Problem/Exercise. I suggest in (a) giving a knapsack problem in which the slack variable is necessarily positive in the optimal solution.

10. p.33, l.10, “that is, those induced by the rigid motions of R^d”.

11. p.35, l.6, “for any pair of matroids M_1, M_2”.

12. p.46, in the Exercise, “P_{I(M_1)} ∩ P_{I(M_2)} ∩ P_{I(M_3)}”.

13. p.49, line before Section 4.1, “minimum-weight matchings”.

14. p.50, l.10. I think this should say “there is some (alternating) path of G.C with more vertices in Y than in X”.

15. p.52, in Claim 1, mention that S^1_{G_1} ∪ S^2_{G_2} is a maximizing matching for α.

16. p.62, in the definition of Eulerian tour, specify that the directed walk must be closed.

17. p.67, l.3, “optimization”.

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18. p.73, l.19, “therefore $\sigma_i^k \leq \sigma_i^{k+1}$”.
19. p.73, l.–5, “Let’s”.
20. p.79, in the Example, “The choice of $u_1 = 0$, $u_2 = 1/2$, $u_3 = 1/2$ yields the cutting plane $-5x_1 - 3x_2 \leq -13$.”
21. p.85, equation (2), change “$\frac{15}{22}$” to “$\frac{7}{22}$”.
22. p.93, l.1, “Assume that the data for $IP$”.
23. p.94, l.2, “is $z^*$.”
24. p.94, l.–6, “is not too large”.
25. p.95, first line of Proof, “is a feasible solution”.
26. p.95, fourth line of Proof, “are satisfied by $x^*$”.
27. p.98, l.4, “lifting the coefficients of $x_1$ and $x_5$” (double check this).
28. p.100, l.2, “with respect to the”.
29. p.106, Problem, l.–2, change “more than” to “at least”. (This only makes a difference in the case $n = 1$.)
30. p.109, reverse the arc with cost 5/6 to go from 5 to 0.
31. p.109, l.–8, “from vertex 4 to vertex 1”.
32. p.110, fourth line before the Exercise, “potential”.
33. p.110, just before the Exercise, clarify the branching procedure for the knapsack problem.
34. p.113, definition of $f(S)$, I think this should be “$f(S) := r_M(S) - \sum_{x \in S} x^*$.”
35. p.114, l.–7, “$f'(x) := \sum_{j=1}^m \lambda_j f(S(x^j))$”.
37. p.115, you need a summation on the right-hand side of both inequalities ($\leq$) and ($\neq$).
38. p.127, l.–3, “$\sum_{i=1}^m y_i a_{ij} = 0$, for $j = 1, 2, \ldots, n$.”