Air cargo load and route planning in pickup and delivery operations

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The authors express their gratitude to the three anonymous reviewers for their comments and criticism, which helped to improve the content and presentation of this paper. We carefully considered all comments from the reviewers, and proceeded to the revision of the text.

We do understand that now our paper achieves the high standard quality of this journal. As will be presented below, we followed the requests from reviewers.

1 #1-a: The entire editorial decision letter

Ms. Ref. No.: ESWA-D-23-16263
Title: Air cargo load and route planning in pickup and delivery operations
Expert Systems With Applications

Dear Carlos,

As Editor, I'm writing this editorial decision letter on your paper submission. If you are interested in submitting a revised version, please read through this entire editorial decision letter carefully and take all actions seriously in order to avoid any delay in the review process of your revised manuscript submission. You need to upload a 'Detailed Response to Reviewers' in the EM system with the following sections while submitting the revised manuscript. Please note that the Required Sections (Section #1-a, Section #1-b, Section #2-a, Section #2-b, Section #3-a, and Section #3-b) defined clearly in this editorial decision letter with specific Compliance Requirements (part of this editorial decision letter) must be clearly labeled and included in the 'Detailed Response to Reviewers'. The Required Sections must be clearly placed before the revised manuscript. NOTE: Section #1-(a) MUST contain the COMPLETE text covered in this email letter from Editor-in-Chief, rather than just only the first paragraph of this email letter from Editor-in-Chief. Please note that we will NOT admit any revised manuscript submission for further review if any of the Required Sections is incomplete or any non-compliance of the ESWA authors' guidelines in the PDF file of the revised manuscript that you approve in EM system. So you need to take both (1) Required Sections and (2) Compliance Requirements seriously to avoid any delay in the review process of your revised manuscript. The font size of the Required Sections should be consistent and readable. All required sections should not be embedded. The Required Sections must be placed clearly BEFORE the revised manuscript and in the order listed as followings:

REQUIRED SECTIONS: Please confirm that your submission includes ALL of the required sections.

- Section #1-a: Including the entire editorial decision letter (i.e., complete text covered in this email letter) from Editor
- Section #1-b: Including your responses to Editor
- Section #2-a: Including the entire comments made by the Associate Editor
- Section #2-b: Including your Point-to-Point responses to the Associate Editor
- Section #3-a: Including the entire comments made by the Reviewer
- Section #3-b. Including your Point-to-Point responses to the Reviewer.

COMPLIANCE REQUIREMENTS: Please confirm that your submission completely complies with the compliance requirements.

Please note that prior to admitting the revised submission to the next rigorous review process, all paper submissions must completely comply with ESWA Guide for Authors (see details at `https://www.elsevier.com/journals/expert-systems-with-applications/0957-4174/guide-for-authors`). These include at least the following Compliance Requirements:

A) Authorship policies - Please also note that ESWA takes authorship very seriously and all paper submissions MUST completely comply with all of the following three policies on authorship (clearly stated in the questionnaire responses in EM system) prior to a rigorous peer review process:

A)-1: The corresponding author needs to enter the full names, full affiliation with country and email address of every contributing author in EM online system. It is also mandatory that every contributing coauthor must be listed in EM at submission.

A)-2: It is mandatory that the full names, full affiliation with country and email address of every contributing author must be included in title (authorship) page of the manuscript. The first page of the manuscript should contain the title of the paper, and the full name, full affiliation with country and email address of every contributing author. The second page of the manuscript should begin with the paper abstract. Note that cover letter is not title (authorship) page.

A)-3: The authorship information in EM system must be consistent with the authorship information on the title (authorship) page of the manuscript.

B) Guidelines of reference style and reference list - Citations in the text should follow the referencing style used by the American Psychological Association (APA).

B)-1: Reference Style: Citations in the text should follow the referencing style used by the American Psychological Association. You are referred to the Publication Manual of the American Psychological Association, Sixth Edition, ISBN 978-1-4338-0561-5. APA's in-text citations require the author's last name and the year of publication. You should cite publications in the text, for example, (Smith, 2020). However, you should not use [Smith, 2020]. Note: There should be no [1], [2], [3], etc in your manuscript.

B)-2: Reference List:

References should be arranged first alphabetically by the surname of the first author followed by initials of the author's given name, and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters 'a', 'b', 'c', etc., placed after the year of publication. For example, Van der Geer, J., Hanraads, J. A. J., & Lupton, R. A. (2010). The art of writing a scientific article. Journal of Scientific Communications, 163, 51-59. `https://doi.org/10.1016/j.Sc.2010.00372`. Note: There should be no [1], [2], [3], etc in your references list.

C) Highlights guidelines - There should be a maximum of 85 characters, including spaces, per Highlight in the Highlights section. Please kindly read this guideline carefully - the guideline does NOT say there should be a maximum of 85 words per Highlight. It says there should be a maximum of 85 characters per Highlight. As examples, the word "impact" consists of 6 characters; the word "significance" consists of 12 characters. Only include 3 to 5 Highlights. Minimum number is 3, and maximum number is 5.

D) Please pay attention to the new journal policy asking for institutional emails in all submissions. Every author must have an institutional email in both, the submission platform and manuscript.

NOTE: Your paper submission will be returned to authors and will NOT be admitted to further review if the revised paper fails to completely comply with the ESWA Authorship policies, ESWA guidelines of reference style and reference list, Highlights guidelines. You need to take the Compliance Requirements seriously to avoid any delay in the review process of your revised manuscript.

To submit a Complete and Compliance revision, please go to `https://www.editorialmanager.com/eswa/` and login as an Author.a

Your username is: `alonso@ita.br`

If you need to retrieve password details, please go to: click here to reset your password

On your Main Menu page is a folder entitled "Submissions Needing Revision". You will find your submission record there.

When you are ready to submit your revised paper, please upload the source files of your revised paper (if in Word, please upload the .doc or docx file; if in .TeX, please upload the .TeX, style) as these would be required in Production if your manuscript gets accepted

Please note that we allow 21 days for the first author revision and 14 days for any additional author revisions that are required.

Note: While submitting the revised manuscript, please double check the author names provided in the submission so that authorship related changes are made in the revision stage. If your manuscript is accepted, any authorship change will involve approval from co-authors and respective editor handling the submission and this may cause a significant delay in publishing your manuscript.Please also check which journals do you select for publication. There is no change back under the condition that the manuscript is accepted

Research Elements (optional) This journal encourages you to share research objects - including your raw data, methods, protocols, software, hardware and more - which support your original research article in a Research Elements journal. Research Elements are open access, multidisciplinary, peer-reviewed journals which make the objects associated with your research more discoverable, trustworthy and promote replicability and reproducibility. As open access journals, there may be an Article Publishing Charge if your paper is accepted for publication. Find out more about the Research Elements journals at `https://www.elsevier.com/authors/tools-and-resources/research-elements-journals?dgcid=ec_em_research_elements_email`.

Yours sincerely,

Joaquín Torres-Sospedra, Ph.D.
Editor
Expert Systems With Applications

2 #1-b: Our responses to Editor

Agradecemos e seguimos todas as orientações do Editor:

- Incluímos neste texto todas as **Required Sections**;
- A submissão do nosso artigo revisado atende todas as **Compliance Requirements**.

3 #2-a: The entire comments made by the Associate Editor

De acordo com a mensagem recebida, parece-nos que os comentários do Associate Editor são os seguintes:

Reviewers' comments:

1. More analysis shall be given to discuss the experimental results.
2. More newly-published related references shall be cited and dicussed in Introduction.
3. More experiments hope to be added to support the conclusion.

4 #2-b: Our Point-to-Point responses to the Associate Editor

Revision: More analysis shall be given to discuss the experimental results.

> *Como pode ser observado logo abaixo, aumentamos substancialmente os dados experimentais apresentados. Consequentemente, houve também um sensível aumento na discussão sobre eles.*
> As can be seen below, we have substantially increased the experimental data presented. Consequently, there was also a noticeable increase in discussion about them. Especially about the overall improvement caused by the run time limit proportional to the volumes of items in each node and the additional experiments to validate the best method found.

Revision: More newly-published related references shall be cited and dicussed in Introduction.

> *Incluímos e comentamos novas referências (procurar trabalhos recentes sobre TSP e PDP em aeronaves).*
> We included the work of (Zhao et al., 2023), that developed an air cargo loading plan that addresses the Air Cargo Palletization Problem (ACPP) and the Aircraft Weight and Balance Problem (WBP) separately, impacting payload optimization and aircraft center of gravity (CG). The authors propose three integer linear programming models: a bi-objective optimization model (BOM), a combinatorial optimization model (COM), and an improved combinatorial optimization model (IOM). The models aim to determine the maximum loading capacity and lowest CG deviation from a specified target CG.
> The study uses Gurobi to solve four scenarios with various conditional metrics for the three models. Results show that the BOM has the fastest solution speed, but the CG deviation is the largest, making the results unacceptable in some cases. The COM takes too long to solve, making it difficult to meet the needs of the actual scene. The IOM accelerates the solving process, but some scenarios still require significant computation time.

Revision: More experiments hope to be added to support the conclusion.

Incluímos novos resultados experimentais (novas figuras, testes, etc.). Concretamente: desempenhos obtidos com outras meta-heurísticas; definição empírica de η_1 and η_2 no algoritmo Shims; limite de tempo variável em cada nó, de acordo com o volume de carga previsto em cada nó; resolução de casos com um maior número de nós.
New experiments were conducted due to two changes suggested by the reviewers:

1. Node solution times depended on the total volume of candidate items to be loaded in each node in relation to the total items volume to be loaded in the tour.

2. A new process of determining the *Shims* volume thresholds for eta_1 and eta_2.

We included Table 10 with the results of the *iRace* tool, a software package that helps to automatically fine-tune algorithm parameters. We fine-tuned parameters $threshold_1$ and $threshold_2$, the relative volumes of each pallet used to determine the indexes η_1 and η_2 for the *Shims* heuristic.

5 #3-a: The entire comments made by the Reviewers

Indicamos a seguir, em cada subseção, os comentários feitos pelos três revisores.

5.1 Reviewer #1

1 In section 2, Literature review in the first and second paragraphs is too simple. Some analysis needs to be given to introduce the research status.

2 In the manuscript, any figures about algorithm simulation results cannot be found. Some figures and analysis are suggested to be presented to show the superiority of the used algorithm.

3 Also, any figures about experiments are not given in the manuscript. "By using a portable computer, our strategy quickly found practical solutions to a wide range of real problems in much less than operationally acceptable time." Could you please show the results with some figures?

4 Too many old references are cited.

5.2 Reviewer #2

This paper addresses the optimization of air cargo load planning and routing for pickup and delivery operations. It introduces a novel problem called the Air

Cargo Load Planning with Routing Pickup and Delivery Problem (ACLP+RPDP), which is mathematically modeled to tackle the challenges of pallet assembly, load balancing, and route planning in air transport.

The problem raised in this paper is innovative and applicable, and the proposed algorithm demonstrates effectiveness in solving the problem. However, there are several issues that need to be addressed:

1. The experimental section lacks effectiveness analysis, where the specific contributions of each strategy are not thoroughly verified and analyzed through separate experiments.
2. The comparative experiment should include both well-known and novel algorithms for a comprehensive evaluation.
3. The algorithm is missing a complexity analysis, which is essential to better understand its efficiency and potential limitations.
4. The inclusion of more figures to illustrate the flow, principle, and results of the algorithm would greatly enhance the clarity and visual representation.
5. The format of the article needs further adjustment, particularly in addressing the existing large blank spaces on pages 7 and 10.

5.3 Reviewer #3

This paper models the ACLP+RPDP of a real case, and develops a problem-solver. The experiments have demonstrated the contributions. However, there are some issues that should be addressed:

1: In section 1, the authors claim that they solve an air cargo problem involving simultaneously APP, WBP, PDP, and TSP. But, there is not clear description of the importance. In other words, the motivation should be enhanced.

2: The literature review is simple. Although some studies focus on the same sub-problem in ACLPP, they still show differences in designing modelling and problem-solver. Apparently, authors should supplement them.

3: In section 5, the running time at each node is fixed. Whether different nodes have different requirements for running time.

4: In section 5.2.2, η_1 and η_2 are set by authors. It is better to study them by experiments.

5: The experimental settings are not complete.

6: To the best of our knowledge, the genetic algorithm is a good method for solving ACLPP. The method is not compared in the experiments.

7: With the increase of nodes, what impact will be brought in solving the problem. The experiments and analysis should be supplemented.

6 #3-b: Our Point-to-Point responses to the Reviewers

Em cada subseção, responderemos os comentários de cada um dos três revisores.

6.1 Reviewer #1

Revision: In section 2, Literature review in the first and second paragraphs is too simple. Some analysis needs to be given to introduce the research status.

> *Aumentamos a revisão da literatura, descrevendo os trabalhos com maior detalhe. Acrescentamos também alguns trabalhos mais recentes. Citar quais são esses trabalhos...*
> We included the work of (Zhao et al., 2023), that developed an air cargo loading plan that addresses the Air Cargo Palletization Problem (ACPP) and the Aircraft Weight and Balance Problem (WBP) separately, impacting payload optimization and aircraft center of gravity (CG). The authors propose three integer linear programming models: a bi-objective optimization model (BOM), a combinatorial optimization model (COM), and an improved combinatorial optimization model (IOM). The models aim to determine the maximum loading capacity and lowest CG deviation from a specified target CG.
> The study uses Gurobi to solve four scenarios with various conditional metrics for the three models. Results show that the BOM has the fastest solution speed, but the CG deviation is the largest, making the results unacceptable in some cases. The COM takes too long to solve, making it difficult to meet the needs of the actual scene. The IOM accelerates the solving process, but some scenarios still require significant computation time.

Revision: In the manuscript, any figures about algorithm simulation results cannot be found. Some figures and analysis are suggested to be presented to show the superiority of the used algorithm.

> *Incluímos figuras comparativas, mostrando o melhor desempenho da heurística Shims. Citar quais são essas figuras...*
> We included a map showing a 15-node tour as to validate the effectiveness of the *Shims* heuristic, we solve a 15-node TSP containing the 15 main Brazilian airports. For this task, we implemented a TSP solution method based on the Genetic Algorithm (GA) that returns a population of 100 tours as input to the ACLP-RPDP solved by *Shims*.

Revision: Also, any figures about experiments are not given in the manuscript. "By using a portable computer, our strategy quickly found practical solutions to

a wide range of real problems in much less than operationally acceptable time." Could you please show the results with some figures?

> *Nas novas figuras incluídas no artigo, mostramos o desempenho dos algoritmos desenvolvidos. Citar quais são essas figuras...*
> The GA run time to solve a 15-node TSP was around three seconds, and the total run time (including the ACLP+RPDP solution by Shims) was around 33 seconds, which we believe is adequate for an operational scenario and using a common hand-held computer.
> A figure was included showing the solution tour.

Revision: Too many old references are cited.

> *Incluímos referências mais recentes (citá-las). De qualquer modo, preferimos manter as antigas, para assim termos um levantamento histórico da evolução da pesquisa neste campo.*
> We included a more recent reference, (Zhao et al., 2023), that demonstrates how hard it is to solve the ACLP and WBP, separately or together.
> In any case, we prefer to keep the old ones so that we have a historical survey of the evolution of research in this field.

6.2 Reviewer #2

Revision: The experimental section lacks effectiveness analysis, where the specific contributions of each strategy are not thoroughly verified and analyzed through separate experiments.

Talvez não tenha ficado claro no texto original, mas três estratégias foram imprescindíveis para que pudéssemos obter alguma solução nas instâncias criadas: (1) considerar $K < m$ para que cada pallet recebesse uma destinação predefinida; (2) em cada tour, calcular uma solução nó a nó; (3) em cada nó intermediário do tour considerado, realocar os packed contents minimizando o torque na aeronave. Sem a adoção destas três estratégias, não conseguimos realizar nenhum experimento, mesmo em instâncias menores. A única estratégia que permitiu diferentes experimentos e comparações foi a heurística utilizada na solução nó a nó. Procuramos deixar isto mais claro na nossa conclusão.
It may not have been clear in the original text, but three strategies were essential for us to obtain a solution in the instances created:

(1) consider $K < m$ so that each pallet received a predefined destination;

(2) on each tour, calculate a node-by-node solution; and

(3) at each intermediate node of the considered tour, relocate the packed contents, minimizing the torque on the aircraft.

Without adopting these three strategies, we were unable to carry out any experiments, even in smaller instances. The only strategy that allowed different experiments and comparisons was the heuristic used in the node-by-node solution. We seek to make this clearer in the discussion of the results and in our conclusion.

Revision: The comparative experiment should include both well-known and novel algorithms for a comprehensive evaluation.

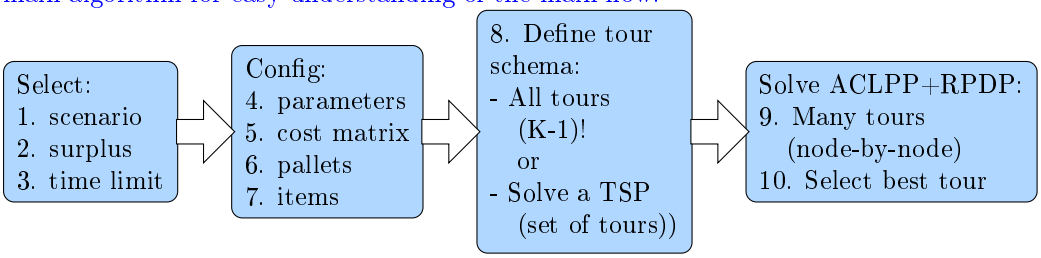
Como estamos lidando com um novo problema, não dispomos de outras resoluções disponíveis na literatura. Na verdade, temos apenas meta-heurísticas bem conhecidas para a solução nó a nó, no qual o torque da aeronave é minimizado. Por este motivo, incluímos novas tabelas comparativas com os resultados obtidos nesses casos.
As we are dealing with a new problem, we do not have other solutions available in the literature. In fact, we only have well-known meta-heuristics for the node-to-node solution, in which the aircraft torque is minimized. For this reason, we have included new comparative tables with the results obtained in these cases.

Revision: The algorithm is missing a complexity analysis, which is essential to better understand its efficiency and potential limitations.

Agradecemos este comentário. Incluímos a análise de complexidade do algoritmo apresentado no nosso artigo.

Revision: The inclusion of more figures to illustrate the flow, principle, and results of the algorithm would greatly enhance the clarity and visual representation.

> *Agradecemos esta sugestão. Acrescentamos novas figuras e tabelas que ilustram melhor nossos resultados. Citar quais são...*
> We included the figure below and its description to depict the main algorithm for easy understanding of the main flow.



> We also included a map of Brazil with the 15 main busy airports and a tour for the reader to get an idea of how close to optimal the solution may be.

Revision: The format of the article needs further adjustment, particularly in addressing the existing large blank spaces on pages 7 and 10.

> *Estes espaços surgiram devido à formatação do LaTeX, e deverão ser eliminados na versão final.*

6.3 Reviewer #3

Revision: In section 1, the authors claim that they solve an air cargo problem involving simultaneously APP, WBP, PDP, and TSP. But, there is not clear description of the importance. In other words, the motivation should be enhanced.

> *Acrescentamos novas motivações para a resolução do ACLP+RPDP, que envolve simultaneamente 4 sub-problemas NP-hard.*

Revision: The literature review is simple. Although some studies focus on the same sub-problem in ACLPP, they still show differences in designing modelling and problem-solver. Apparently, authors should supplement them.

> *Agradecemos esta sugestão. Incluímos mais informações na revisão da literatura, indicando as modelagens e os métodos de resolução.*

Revision: In section 5, the running time at each node is fixed. Whether different nodes have different requirements for running time.

Agradecemos esta sugestão. Entre os novos resultados apresentados, incluímos uma resolução na qual o tempo dedicado a cada nó é proporcional à carga disponível para embarque.
An important experiment inclusion was regarding the time limit to solve a node. This was adjusted to be proportional to the sum of the volumes of the candidate items in the node, as each node has a different number of items to be embarked.
This inclusion certainly contributed to the slight improvement observed in the results.

Revision: In section 5.2.2, η_1 and η_2 are set by authors. It is better to study them by experiments.

Estudamos a viabilidade de definir empiricamente os valores dessas constantes do algoritmo Shims. Explicar...
After the items were generated, some experiments with the *iRace* tool were executed to determine the values for volume limits $threshold_1$ and $threshold_2$ used in *Shims*, whose results are presented in Table 1.

Table 1: *iRace* testing results

surplus	***threshold*$_1$** for η_1	***threshold*$_2$** for η_2	**run time** (min)
1.2	0.8621	1.0539	47
1.5	0.9199	1.1399	59
2.0	0.9617	1.5706	63

For these tests, we considered the odd instances (1, 3, 5, 7) as the **training** set and the even instances (2, 4, 6) as the **testing** set for the *iRace* runs. We supplied *iRace* for $threshold_1$ determination, the range [0.8, 1.0], and for $threshold_2$, the range [1.0, 2.0]. The number of iterations in each experiment was limited to 3000 executions for *iRace* to have plenty of data for its statistical tests. More detail about these configurations may be found on the *iRace* user guide in `https://cran.r-project.org/web/packages/irace/irace.pdf`.

Revision: The experimental settings are not complete.

Não entendemos este comentário... De qualquer modo, aumentamos a seção de experimentos do nosso artigo, procurando definir todas as variáveis envolvidas. Caso reste algum ponto obscuro, pedimos ao revisor que o especifique, por favor.
An important experiment inclusion was regarding the time limit to solve a node. This was adjusted to be proportional to the sum of the volumes of the candidate items in the node, as each node has a different number of items to be embarked.

Revision: To the best of our knowledge, the genetic algorithm is a good method for solving ACLPP. The method is not compared in the experiments.

Analisamos as resoluções do ACLPP através de algoritmos genéticos. Explicar...
We implemented the genetic algorithm with DEAP (Distributed Evolutionary Algorithms in Python), an evolutionary computation framework available at `https://github.com/deap/deap`. More details can be found in (Fortin et al., 2012).

(Peerlinck and Sheppard, 2022) applied DEAP to solve a multi-objective knapsack problem.

Our GA implementation is not complete. Due to performance issues, we did not include the constraints regarding the Weight and Balance (WBP) or the Pickup and Delivery (PDP) problems. In the first attempt, considering only the weight and volume constraints, our implementation of DEAP managed to solve problems up to 100 items to be allocated to 18 pallets in less than 10 seconds. When we included the item count constraint to prevent each item from being allocated to more than one pallet, it was able to solve only small problems (20 items on 2 pallets).
We increased the number of items to 150, and the number of pallets to 18, but, even adjusting the GA parameters to more generations (2400) and more individuals (1200), DEAP did not generate any feasible solution. The run time of this attempt was around 10 minutes.
For the crossover probability, we tested the range [0.6 - 0.8], and for the mutation probability, we tested from 0.01 to 0.1 with no success.

The implemented code is available in `https://github.com/celiomesquita/ACLP_RPDP_P/blob/main/ga_deap_mmkp.py`.

The palletization planning of 200 to 1000 items per node in a set of 18 aircraft pallets may be an inadequate problem to be solved with GA.
Large chromosome sizes, like 18,000-dimension arrays, can pose significant challenges in using genetic algorithms.
The computational complexity is significant, as each generation requires evaluating individual fitness, which can be resource-intensive.
Large chromosomes can slow GA convergence due to the vast search space, potentially requiring more generations to find optimal solutions.
Efficient encoding and decoding of the problem into the chromosome and decoding solutions is crucial for a 18,000-dimension array. Also, the design of the fitness function becomes more critical as chromosome size increases, as it needs to guide the evolutionary process without being overly computationally demanding.

We hope that these considerations help justify why we did not include GA as a candidate method to solve the ACLP+RPDP.

Revision: With the increase of nodes, what impact will be brought in solving the problem. The experiments and analysis should be supplemented.

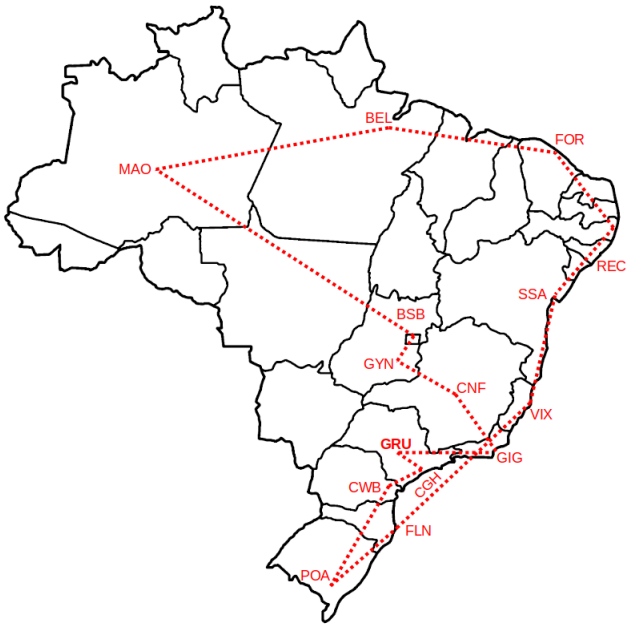
Agradecemos esta sugestão. Incluímos resultados da resolução de casos com um maior número K de nós, mantendo a suposição $K < m$, necessária para a definição prévia da destinação dos pallets. Para isso, utilizamos uma heurística conhecida para o TSP, aplicando nosso algoritmo apenas nesse tour.

To validate the effectiveness of the *Shims* heuristic, we solve a 15-node TSP containing the 15 main Brazilian airports. For this task, we implemented a TSP solution method based on the Genetic Algorithm (GA) that returns a population of 100 tours as input to the ACLP-RPDP solved by *Shims*. The GA run time was around three seconds, and the total run time was around 33 seconds.

We implemented the GA with DEAP (Distributed Evolutionary Algorithms in Python), an evolutionary computation framework available in `https://github.com/deap/deap`. More details can be found in (Fortin et al., 2012).

The implemented code is available in `https://github.com/celiomesquita/ACLP_RPDP_P/blob/main/tsp_deap.py`.

Figure 1: *Shims/GA* best ACLP+RPDP tour



The airports cited in Figure 1 are: São Paulo (GRU), Congonhas (CGH), Curitiba (CWB), Porto Alegre (POA), Florianópolis (FLN), Vitória (VIX), Salvador (SSA), Recife (REC), Fortaleza (FOR), Belém (BEL), Manaus (MAO), Brasília (BSB), Goiânia (GYN), Confins (CNF), and Rio de Janeiro (GIG), returning to GRU.

References

Fortin, F.-A., De Rainville, F.-M., Gardner, M.-A., Parizeau, M., and Gagné, C. (2012). DEAP: Evolutionary algorithms made easy. *Journal of Machine Learning Research*, 13:2171–2175.

Peerlinck, A. and Sheppard, J. (2022). Multi-objective factored evolutionary optimization and the multi-objective knapsack problem. In *2022 IEEE Congress on Evolutionary Computation (CEC)*, pages 1–8. IEEE.

Zhao, X., Dong, Y., and Zuo, L. (2023). A combinatorial optimization approach for air cargo palletization and aircraft loading. *Mathematics*, 11(13):1–16.