

A Mixed-Integer Programming Formulation Applied for Optimal Bids in an Electricity Spot Market

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Abstract

1 Introduction

General Explanation of the main problem and introduce the different approaches. Explaining the principal mathematics used in the paper to introduce the following sections properly.

2 Presentation of the different approaches

Present Fampa's approaches using heuristics and MILP and trying to summarize Main paperwork.

3 New Formulation of the problem Fampa

Explain the main difference

3.1 Proposition - optimal bid price

Short text introducing the proposition

3.2 Proof

Introduction to the proof with the comparison of our price bid to the precedent and following one. Then explaining why the profit either increases or stays equal by comparing all the possibilities. Good idea to introduce graphics for better understanding ? Explaining the use of the two new binary variables to our model and rewrite the model with those variables. Showing that we face a problem with 2 of the inequalities(they are non-linear) and the solution(proof the solution with a matrix cf réunion Etienne). Finally give a quick conclusion to this formulation.

4 Shortest Path Algorithm

Explain how it's a relaxation of the problem, introduce new variables needed

4.1 1st proposition - impact on profit

Short text introducing the proposition with the visuals to help understand

4.2 Proof

For a given scenario, let's compare the of the 3 different possibilities. End with a short conclusion with the huge R function. Important Add graphics cf réunion Etienne

4.3 2nd proposition - Thresholds

Short text introducing the proposition and explaining the different thresholds.

4.4 Proof

We start by explaining the thesis of the proof. We compare the 2 different cases where G_i , the cumulative bid quantities, are not at thresholds. For the second case we will discuss the dependency of increasing G_i to the next threshold with the spot price. Good idea to show the comparisons with graphs for better understanding. End with a conclusion.

4.5 The shortest path

We will use the 2 precedent propositions to explain R_{max} solution. Explain the single bid profit function and its 3 regimes. End with a huge conclusion on the algorithm and its use. Use graphics to explain how this model can be seen as a shortest path and to explain the logic behind R_{max}