1 All Reviewers

We thank the reviewers for their input and time. We were happy to see that our contribution was considered informative and original. We will respond to each reviewer's comments individually.

2 Reviewer 1

We certainly agree with your assessment of the importance of computationally efficient methods for identification. As you noticed, there is a large body of specialized previous work that we build upon, which makes a relatively limited introduction/preliminaries section unavoidable given the restricted space. To partly remedy the issue, we will add the relevant definitions and theorems from the literature into the supplemental material, and include a note referencing them in the preliminaries. We will also revise and improve the preliminaries to alleviate your concerns about the conceptual jump between our treatment of structural parameters and flow graphs.

Our reference to "arbitrary SCM" in the abstract was meant to imply arbitrary graphical structures. We recognize that this might have caused confusion, so we have changed it to read "arbitrary linear SCM". We do assume linearity in our work and focus on algorithmic aspects of identification methods for linear models.

Finally, given the space constraints, and the level of technical specialization in our references, we have opted to dedicate more space towards explaining our main theoretical results rather than adding an experimental section. Still, we do plan to add experiments in a longer report following from this paper.

3 Reviewer 2

We were delighted to hear that you found the paper interesting and deserving of publication, much appreciated. We certainly recognize that our paper compressed quite a bit of details, especially with regard to the previous literature. To help interested readers gain context, we have opted to copy the relevant definitions and theorems from previous works into the supplement, and to revise the preliminaries for greater clarity. The paper will not fit a full explanation of the previous works, but we expect (and hope) that these changes will make our work easier to parse.

While we think that space restrictions make adding an experimental section impractical, we plan to release an implementation of the algorithms in the paper (in Python), including the IC and AVS algorithms. We plan to make the link available in the text whenever anonymity is no longer an issue.

Finally, we thank you for the corrections and suggestions in the "Minor Comments".

4 Reviewer 3

We are happy that you found our paper of high quality and are very grateful for the detailed corrections. We have noticed the typo in Algorithm 1, and have updated all algorithms in the paper to more directly mirror our Python code, which we will release with the paper. We have also reworded the theorems to improve legibility and precision. In particular, Theorem 3.1 now reads:

Given a directed acyclic graph $G = (V, D)$, a set of source nodes S, sink nodes T, and a max flow $\mathcal{F}$ from S to T in G with vertex capacity 1, if a node $t_i \in T$ has 0 flow crossing it in $\mathcal{F}$, then there do not exist subsets $S_m \subseteq S, T_m \subseteq T$ where S_m, T_m are match-blocked and $t_i \in T_m$. Furthermore, for any match-block (S_m, T_m), we have $|S_m \cap An(t_i)| = 0$.

It is also correct that all max-match-blocks have the same T – we will add a more explicit proof of this fact into the supplement. Finally, as was noticed, the Edmond-Gallai decomposition is defined on undirected graphs, and is focused on single edges. Our task requires paths in a DAG, and these paths are between two separate sets of nodes. Still, we would be glad to use previous literature to improve our match-block algorithm even further. The relevant works we found are listed in footnote 2 on page 4, but cannot be directly applied due to complexities arising from the full DAG.

Other minor corrections: Thanks, fixed!