

1 We thank the reviewers for their positive comments. Below we address some minor concerns raised.

2 • Reviewer 1: Thank you for supporting our work. One minor clarification:

3 [...*conservative p-values mean the data "surprised" the researcher...*] We expect conservative nulls to be the norm
4 in practice primarily because they would be uniform only if the parameter lay at the boundary of the null set. For
5 example, in an A/B test the null is: $\theta_B \leq \theta_A$, and the p-value would be uniform only if $\theta_B = \theta_A$, and would be
6 conservative otherwise (as explained in lines 58-67 of the paper). We can add an explicit example. As you rightly
7 point out, the main strength of ADDIS is that the price of protection is minor.

8 • Reviewer 2: Thank you for your careful reading. Indeed, it should be $\widehat{\text{FDP}}_{\text{LORD++}}$ in the line 120, and $\lambda\tau > \alpha$ in line
9 158. We will correct these typos.

10 [...*demonstrate with real-data experiments...*] The request about the real data experiments is fair enough. Unfortu-
11 nately, there are two hurdles with real data. The first is that we are not aware of any publicly available dataset of
12 this kind, because (for example) all the tech companies that run such large sequences of experiments keep their data
13 proprietary. The second is that even if the data were made available and ADDIS had more discoveries than (say)
14 LORD++, we would not know which of the extra discoveries were false positives, and which were true positives,
15 because the ground truth is unknown. Thus we resort to simulations to compare algorithms, which are realistic since
16 practitioners often resort to the central limit theorem (averages behave like Gaussians) to design their tests (like
17 t-tests). We will clarify this in the paper.

18 • Reviewer 4: Thank you for your thoughtful review.

19 [...*CDF is bounded and therefore can not be a convex function on \mathbb{R} ...*] Indeed, a CDF defined on \mathbb{R} cannot be convex.
20 However, the argument is made for the CDF of p-values, which is defined in the range of $[0, 1]$. Concrete examples
21 for p-values with convex CDF involve the content following the two bullet points in lines 53-56. We will clarify this.