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REJOINDER: THE DANTZIG SELECTOR: STATISTICAL ESTIMATION WHEN p IS MUCH LARGER THAN n

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First of all, we would like to thank all the discussants for their interest and comments, as well as for their thorough investigation. The comments all underlie the importance and timeliness of the topics discussed in our paper, namely, accurate statistical estimation in high dimensions. We would also like to thank the editors for this opportunity to comment briefly on a few issues raised in the discussions.

Of special interest is the diversity of perspectives, which include theoretical, practical and computational issues. With this being said, there are two main points in the discussions that are quite recurrent:

1. Is it possible to extend and refine our theoretical results, and how do they compare against the very recent literature?
2. How does the Dantzig Selector (DS) compare with the Lasso?

We will address these issues in this rejoinder but before we begin, we would like to restate as simply as possible the main point of our paper and put this work in a broader context so as to avoid confusion about our point of view and motivations.

1. Our background. We assume a linear regression model

$$y = X\beta + z, \tag{1}$$

where y is a p-dimensional vector of observations, X is an n by p design matrix and z is an n-dimensional vector which we take to be i.i.d. $N(0, \sigma^2)$ for simplicity. We are interested in estimating the parameter vector β in the situation where the number p of variables is greater than the number n of observations. Under certain conditions on the design matrix X which roughly guarantee that the model is identifiable, the main message of the paper is as follows:

(i) First, it is possible to find an estimator $\hat{\beta}$, which does nearly as well as if one had an oracle supplying perfect information about which variables actually are present in the model, and which entries of the vector β are worth estimating.

(ii) Second, such an estimator may be found by solving a very simple linear program (LP).

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