



Conditional selective inference for robust regression and outlier detection using piecewise-linear homotopy continuation

Toshiaki Tsukurimichi¹ · Yu Inatsu¹ · Vo Nguyen Le Duy^{1,2} · Ichiro Takeuchi^{1,3,4}

Received: 1 February 2021 / Revised: 4 January 2022 / Accepted: 23 March 2022 /

Published online: 27 August 2022

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Abstract

In this paper, we consider conditional selective inference (SI) for a linear model estimated after outliers are removed from the data. To apply the conditional SI framework, it is necessary to characterize the events of how the robust method identifies outliers. Unfortunately, the existing conditional SIs cannot be directly applied to our problem because they are applicable to the case where the selection events can be represented by linear or quadratic constraints. We propose a conditional SI method for popular robust regressions such as least-absolute-deviation regression and Huber regression by introducing a new computational method using a convex optimization technique called homotopy method. We show that the proposed conditional SI method is applicable to a wide class of robust regression and outlier detection methods and has good empirical performance on both synthetic data and real data experiments.

Keywords Selective inference · Robust regression · Parametric programming · Outlier detection

✉ Ichiro Takeuchi
ichiro.takeuchi@mae.nagoya-u.ac.jp

Extended author information available on the last page of the article

Authors and Affiliations

Toshiaki Tsukurimichi¹ · Yu Inatsu¹ · Vo Nguyen Le Duy^{1,2} · Ichiro Takeuchi^{1,3,4}

Toshiaki Tsukurimichi
tsukurimichi.t.mllab.nit@gmail.com

Yu Inatsu
inatsu.yu@nitech.ac.jp

Vo Nguyen Le Duy
duy.mllab.nit@gmail.com

¹ Department of Engineering, Nagoya Institute of Technology, Gokiso-cho, Showa-ku, Nagoya, Aichi 466-8555, Japan

² RIKEN, 2-1 Hirosawa, Wako, Saitama 351-0198, Japan

³ Now at Department of Engineering, Nagoya University, Furo-cho, Chikusa-ku, Nagoya, Aichi 464-8603, Japan

⁴ RIKEN Center for Advanced Intelligence Project, Nihonbashi, 1 Chome – 4 – 1, Chuo City, Tokyo 103-0027, Japan