RECEIVED: August 28, 2018

ACCEPTED: August 28, 2018

PUBLISHED: September 3, 2018

Erratum: Black holes and random matrices

Jordan S. Cotler,^a Guy Gur-Ari,^a Masanori Hanada,^{a,b,c} Joseph Polchinski,^{d,e}
Phil Saad,^a Stephen H. Shenker,^a Douglas Stanford,^f Alexandre Streicher^{a,d}
and Masaki Tezuka^g

^aStanford Institute for Theoretical Physics, Stanford University,
Stanford, CA 94305, U.S.A.

^bYukawa Institute for Theoretical Physics, Kyoto University,
Kyoto 606-8502, Japan

^cThe Hakubi Center for Advanced Research, Kyoto University,
Kyoto 606-8501, Japan

^dDepartment of Physics, University of California,
Santa Barbara, CA 93106, U.S.A.

^eKavli Institute for Theoretical Physics, University of California,
Santa Barbara, CA 93106, U.S.A.

^fInstitute for Advanced Study,
Princeton, NJ 08540, U.S.A.

^gDepartment of Physics, Kyoto University,
Kyoto 606-8502, Japan

E-mail: jcotler@stanford.edu, guyga@stanford.edu,
hanada@yukawa.kyoto-u.ac.jp, joep@kitp.ucsb.edu,
philsaad@stanford.edu, sshenker@stanford.edu, stanford@ias.edu,
alex@physics.ucsb.edu, tezuka@scphys.kyoto-u.ac.jp

ERRATUM TO: [JHEP05\(2017\)118](#)

ARXIV EPRINT: [1611.04650](https://arxiv.org/abs/1611.04650)

We have found a minor normalization error in some of the plots in this paper. This error has *no* effect on the qualitative or quantitative conclusions of the paper.

The main error was to numerically compute $g(t)$ by dividing $Z(\beta, t)$ by its value at the first time point on the plot, rather than $Z(\beta, t = 0)$. This results in an approximately 1 % constant shift in $g(t)$ which turns into a barely visible vertical displacement on the log log plots. The two lines in the left panel of figure 1 below give the old and new values.

This error affects the values of $g(t, \beta)$ in figures 1, 2, 4, 7, 10, and 12 in the original publication. See figures 1 and 2 of this erratum for a comparison between the erroneous and corrected data in figures 1, 2, 4 and 12, and figure 3 for the corrected versions of figures 7 and 10.

We have also uncovered a few other minor errors. These are:

1. In figure 2 of the original publication two consecutive samples of dimension 2^{12} were used instead of a single sample of dimension 2^{13} . Therefore the correct value at late time is almost doubled from the previous version, as in the right panel of figure 1 of this erratum.
2. We used 1 000 000 samples for $N_m = 16$ for $g(t)$, $g_c(t)$, and $g_d(t)$ plotted in figures 4 and 12 and 1 200 000 samples for $\tilde{\rho}(E)$ plotted in figure 15 in the original publication. Also, the number of samples for $N_m = 30$ was 914, rather than 1000 as stated in the captions of these figures. See figure 2 of this erratum for the corrected version of figure 12, with 1200000 samples for $N_m = 16$ and 914 samples for $N_m = 30$, which contains the plots of $g(t)$ corresponding to figure 4.
3. We used different time steps for the single sample and 90 samples data for figure 10 in the original publication. See the right panel of figure 3 of this erratum for the corrected version. We have taken advantage of this correction to use a different, more appropriate, scale on the plot.
4. A corrected version of the entire paper has been posted to the arXiv.

Open Access. This article is distributed under the terms of the Creative Commons Attribution License ([CC-BY 4.0](https://creativecommons.org/licenses/by/4.0/)), which permits any use, distribution and reproduction in any medium, provided the original author(s) and source are credited.

Figure 1. Left: corrected version of figure 1 in the original publication. The old and corrected data for $g(t; \beta = 5)$ obtained for 90 samples of the SYK model with $N_m = 34$ are compared. Right: corrected version of figure 2 in the original publication. The corrected plot of $g(t; \beta = 5)$ for 2^{12} -dimensional GUE random matrices is shown along with the original plot.

Figure 2. Left: figure 12 of the original publication. Right: corrected version.

Figure 3. Left: corrected version of figure 7 in the original publication. Comparison of the large- N estimate against the corrected data. Right: corrected version of figure 10 in the original publication. Note that the difference in the appearance of the graph comes mainly from the number of data points and the scale, rather than from using the correct $Z(\beta)$ instead of $Z(\beta, t_0 = 0.1)$.