Erratum to Automatic Tuning for Data-driven Model Predictive Control

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This document corrects minor errors in the published conference paper "Automatic Tuning for Data-driven Model Predictive Control," which appeared in the proceedings of the 2021 IEEE International Conference on Robotics and Automation (ICRA). The errors stem from an implementation mistake in the subroutine which evaluates the RMSE of system ID model predictions. This mistake caused model RMSE scores to be underestimated by a factor between 1 and 5 depending on the experimental setting. Consequently, Table II of the original publication is inaccurate. The corrected results are shown below.

The most significant changes from the original results are the RMSE scores for the MLP model on the half-cheetah dataset and the RMSE scores for the GP model on all three datasets. On half-cheetah, the MLP model does not outperform the ARX and Koopman models by as large a margin as originally reported. On all three datasets, the GP model performs worse than the ARX and Koopman models, instead of outperforming them as originally reported. Additionally, between the time of original publication and now, we improved the implementation of the SINDy algorithm, which allows it to achieve performance comparable to the ARX and Koopman models on the Half-cheetah system, instead of substantially under-performing them as originally reported. We note, however, that auto-tuning has a much harder time finding a good hyperparameter configuration for SINDy compared to the other models.

Sys. ID	Pendulum	Cart-pole	Half-cheetah
ARX	2.08	1.87	5.68
Koopman	2.48	2.04	5.62
SINDy	0.02	0.00	5.70
GP	1.52	3.76	6.10
MLP	0.21	0.17	5.05

TABLE I: Correction to Table II in the original paper.