Errata:
Discrete time LPV I/O and State Space Representations, Differences of Behavior and Pitfalls of Interpolation

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I. Foreword

This note is to highlight an error in the published paper [1]. This hidden mistake had remained unnoticed till a general framework for LPV realization and transformations was introduced in [2]. In case of other errors or comments, please do not hesitate to contact the corresponding author.

II. Errors

A. *Realization via the reachability canonical form*

The given relations in Equations (29), (30), (31) and (32) concerning the transformation of the coefficients in a realization of an LPV-IO representation as a LPV-SS representation (and vice versa) are incorrect. From the general analysis of the realization problem provided in [2] and in [3], it turns out that there exists no simple analytical form which would describe the transformation between these coefficient functions. The provided relations here concern only a special case (to which the treated example unfortunately belongs to) and hence fail to represent the full depth of the transformation problem. Despite the problem in Equations (29), (30), (31) and (32), the conversion rules in the observability case (i.e., Equations (19), (20), (21) and (22)) hold in general in the SISO case and provide an easy short cut in the realization process. As pointed out in [3], the realization is more complicated in the MIMO case due to inherent degrees of freedom associated with the formulation of canonical forms. Hence, a general relation between the coefficient functions can not be provided in the MIMO case.

References

[1] R. Tóth, F. Felici, P. S. C. Heuberger, and P. M. J. Van den Hof, "Discrete time LPV I/O and state space representations, differences of behavior and pitfalls of interpolation," in *Proc. of the European Control Conf.*, Kos, Greece, July 2007, pp. 5418–5425.
[2] R. Tóth, J. C. Willems, P. S. C. Heuberger, and P. M. J. Van den Hof, "The behavioral approach to linear parameter-varying systems," *in print, IEEE Trans. on Automatic Control*, 2011.
[3] R. Tóth, *Modeling and Identification of Linear Parameter-Varying Systems*, ser. Lecture Notes in Control and Information Sciences, Vol. 403. Springer-Germany, 2010.

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