



Correction to: On the use of adjoint gradients for time-optimal control problems regarding a discrete control parameterization

Daniel Lichtenecker¹ · Daniel Rixen¹ · Philipp Eichmeir^{2,3} · Karin Nachbagauer^{4,3}

Published online: 4 May 2023
© The Author(s) 2023

Correction to: Multibody System Dynamics (2023)
<https://doi.org/10.1007/s11044-023-09898-5>

Equations 62–64 were correct as the formula was deemed wrong. The updated equations are as follows:

$$\delta W_i = M_i \delta \theta = M_i \frac{\partial \theta}{\partial \mathbf{q}} \delta \mathbf{q} = \mathbf{Q}_i^\top \delta \mathbf{q}, \quad (62)$$

$$\mathbf{Q}_u = u \left(\frac{\partial \theta}{\partial \mathbf{q}} \right)^\top, \quad (63)$$

$$\mathbf{Q}_d = f_d \left(\frac{\partial \theta}{\partial \mathbf{q}} \right)^\top. \quad (64)$$

The original article can be found online at <https://doi.org/10.1007/s11044-023-09898-5>

✉ D. Lichtenecker
daniel.lichtenecker@tum.de

D. Rixen
rixen@tum.de

P. Eichmeir
philipp.eichmeir@fh-wels.at

K. Nachbagauer
karin.nachbagauer@fh-wels.at

¹ TUM School of Engineering and Design, Department of Mechanical Engineering, Chair of Applied Mechanics, Munich Institute of Robotics and Machine Intelligence (MIRMI), Technical University of Munich, Munich, Germany

² Institute of Mechanics and Mechatronics, Vienna University of Technology, Getreidemarkt 9/E325, 1060, Wien, Austria

³ Faculty of Engineering and Environmental Sciences, University of Applied Sciences Upper Austria, Stelzhamerstraße 23, 4600, Wels, Austria

⁴ Institute for Advanced Study, Technical University of Munich, Lichtenbergstraße 2a, 85748, Garching, Germany

The symbol ω in the sentence just before Eq. (66) and in Eq. (66) is changed to \mathbf{v} to avoid misunderstanding. The following paragraph contains that symbol change.

Introducing the generalized velocities $\mathbf{v} = \dot{\mathbf{q}}$ as additional variables transforms the second-order differential equation for \mathbf{q} into a first-order system

$$\begin{pmatrix} \mathbf{I} & \mathbf{0} \\ \mathbf{0} & \mathbf{M} \end{pmatrix} \begin{pmatrix} \dot{\mathbf{q}} \\ \dot{\mathbf{v}} \end{pmatrix} = \begin{pmatrix} \mathbf{v} \\ \mathbf{Q}_u + \mathbf{Q}_d - \mathbf{Q}_k \end{pmatrix}. \quad (66)$$

Declarations

Competing Interests The authors declare no competing interests.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.