APPENDIX

A

Appendix

Two data sets for models derived from a small-size humanoid robot HOAP-2 [1] are presented below. One of the models resembles the original with arms comprising four degrees of freedom (DoFs). In the other model, three more joints are added to the arms (wrist joints) to obtain kinematically redundant arms that can perform a number of application tasks. The data sets are in YAML format. They can be downloaded and directly used in the Chorenoid simulation environment (cf. Chapter 8).

As a common rule, the numbering of the joints is in agreement with the tree structure of the robot. The structure is determined by the limbs extending from the base link, as shown in Fig. 2.1. Thus, the joints of each limb are numbered in increasing order, starting from the joint proximal to the base link. Note that in the upper-body part there is a torso joint. This joint does not appear in the models, i.e. the base link is constituted of the pelvis and the trunk.

A.1 MODEL PARAMETERS FOR A SMALL-SIZE HUMANOID ROBOT WITH 4-DOF ARMS

The naming and numbering of the joints is shown in Fig. A.1. Link lengths are given in Fig. A.2 and Fig. A.3. The coordinate frames are shown in Fig. A.4. The data file for the inertia and other parameters can be downloaded from [2].

A.2 MODEL PARAMETERS FOR A SMALL-SIZE HUMANOID ROBOT WITH 7-DOF ARMS

The naming and numbering of the joints is shown in Fig. A.5. Link lengths are given in Fig. A.6 and Fig. A.7. The coordinate frames are shown in Fig. A.8. The data file for the inertia and other parameters can be downloaded from [3].

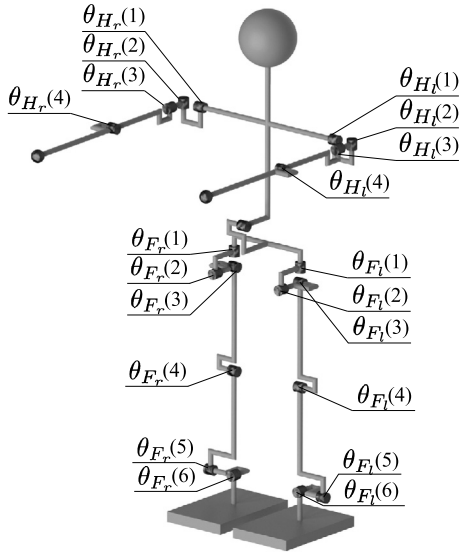

FIGURE A.1 Joint angle naming and numbering for the model with 4-DoF arms.

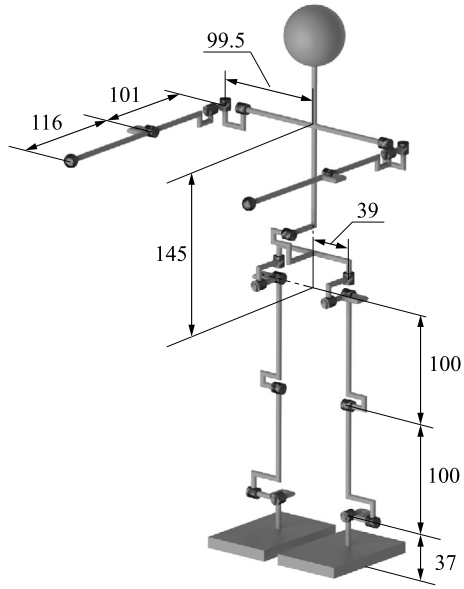

FIGURE A.2 Link lengths (in mm) for the model with 4-DoF arms.

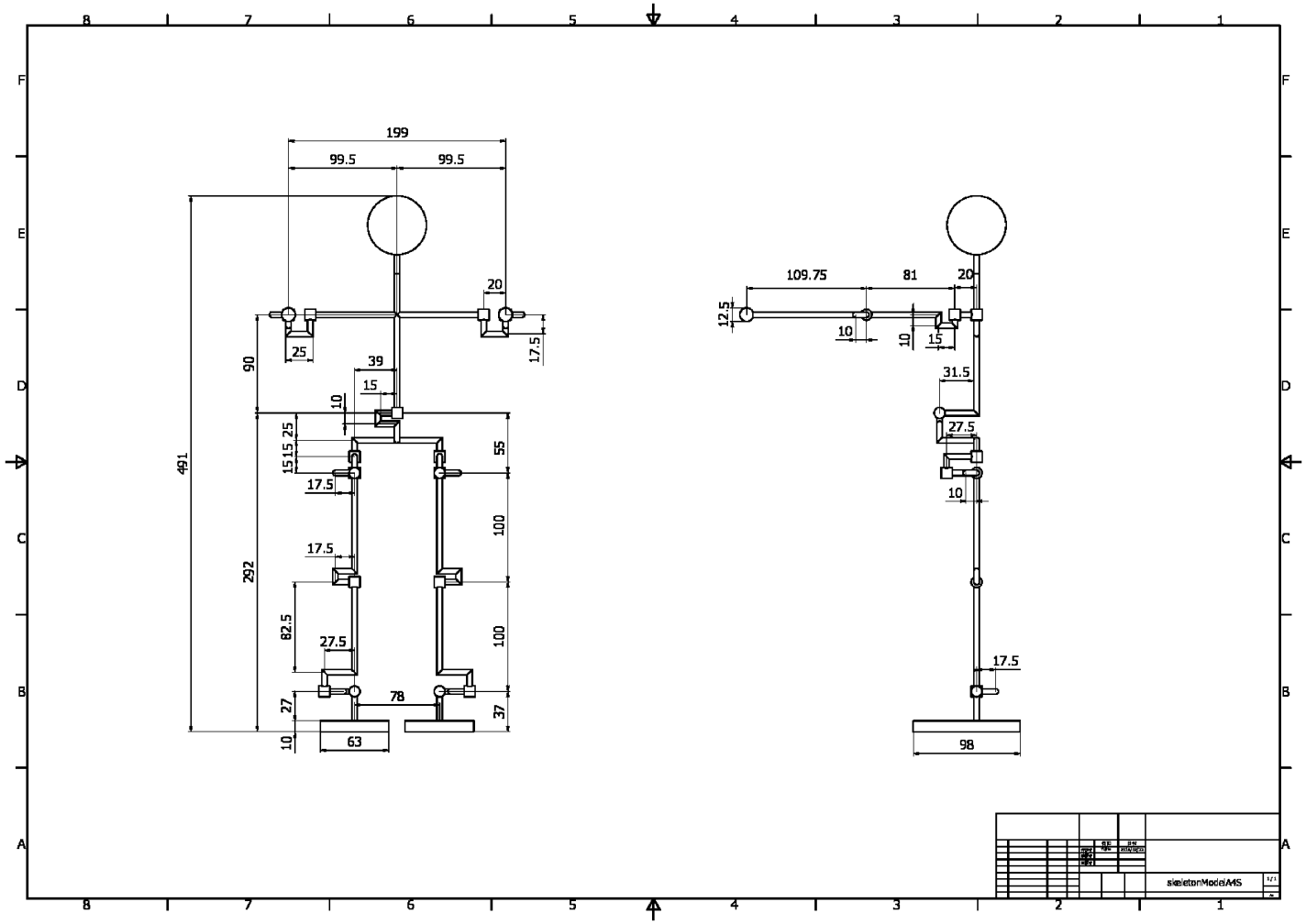

FIGURE A.3 Distances (in mm) from CAD data for the model with 4-DoF arms.

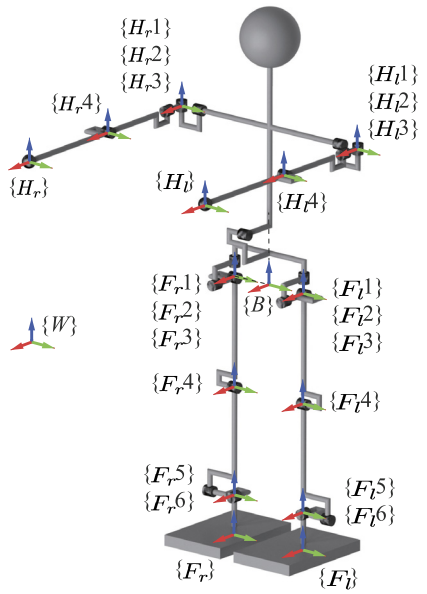

FIGURE A.4 Coordinate frames of the model with 4-DoF arms.

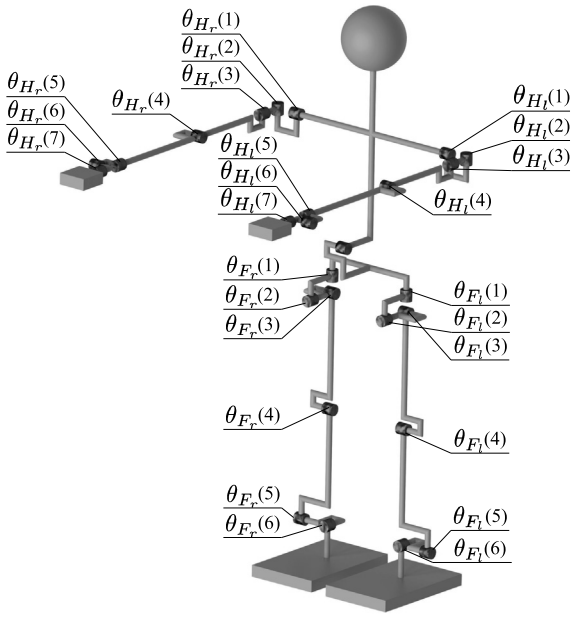

FIGURE A.5 Joint angle naming and numbering for the model with 7-DoF arms.

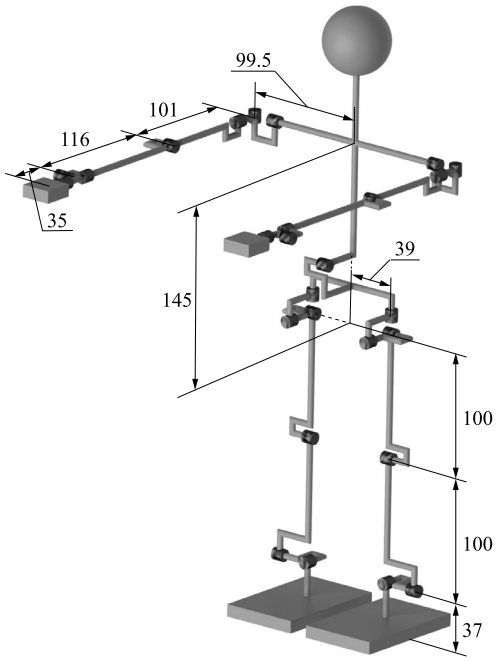

FIGURE A.6 Link lengths (in mm) for the model with 7-DoF arms.

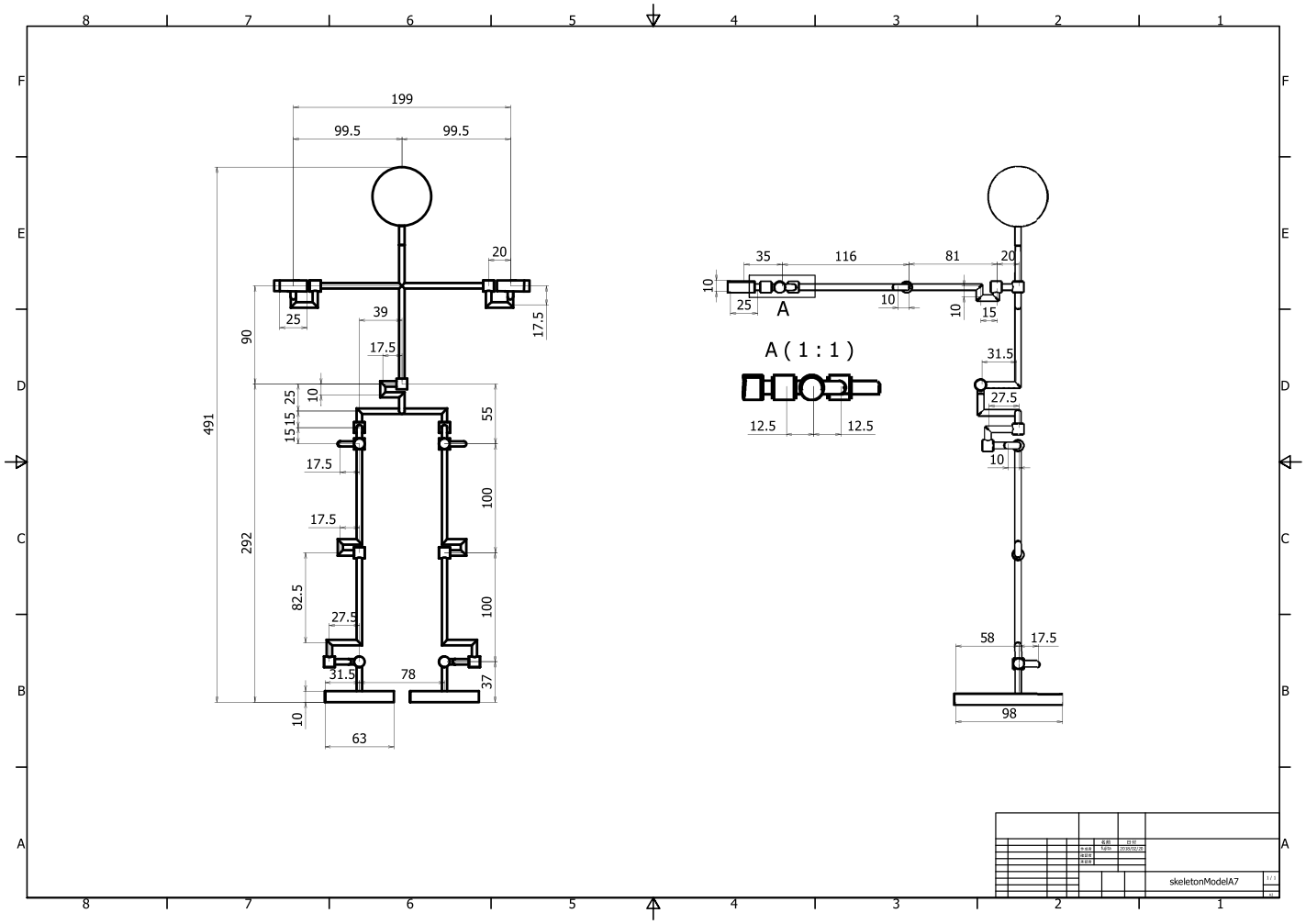

FIGURE A.7 Distances (in mm) from CAD data for the model with 7-DoF arms.

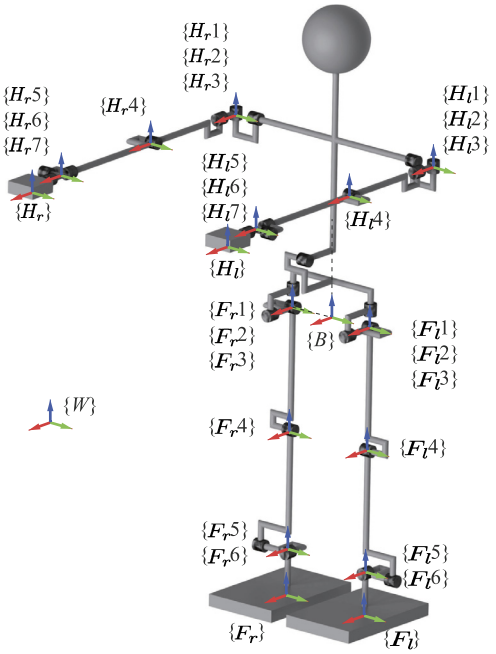

FIGURE A.8 Coordinate frames of the model with 7-DoF arms.

References

[1] Fujitsu, Miniature Humanoid Robot HOAP-2 Manual, 1st edition, Fujitsu Automation Co., Ltd, 2004 (in Japanese).

[2] RLS@TCU, Data set for a small-size humanoid robot model with four-DoF arms, Robotic Life Support Laboratory, Tokyo City University, 2018, https://doi.org/10.1016/B978-0-12-804560-2.00016-X.

[3] RLS@TCU, Data set for a small-size humanoid robot model with seven-DoF arms, Robotic Life Support Laboratory, Tokyo City University, 2018, https://doi.org/10.1016/B978-0-12-804560-2.00016-X.