LIGHTNESS
BY DESIGN

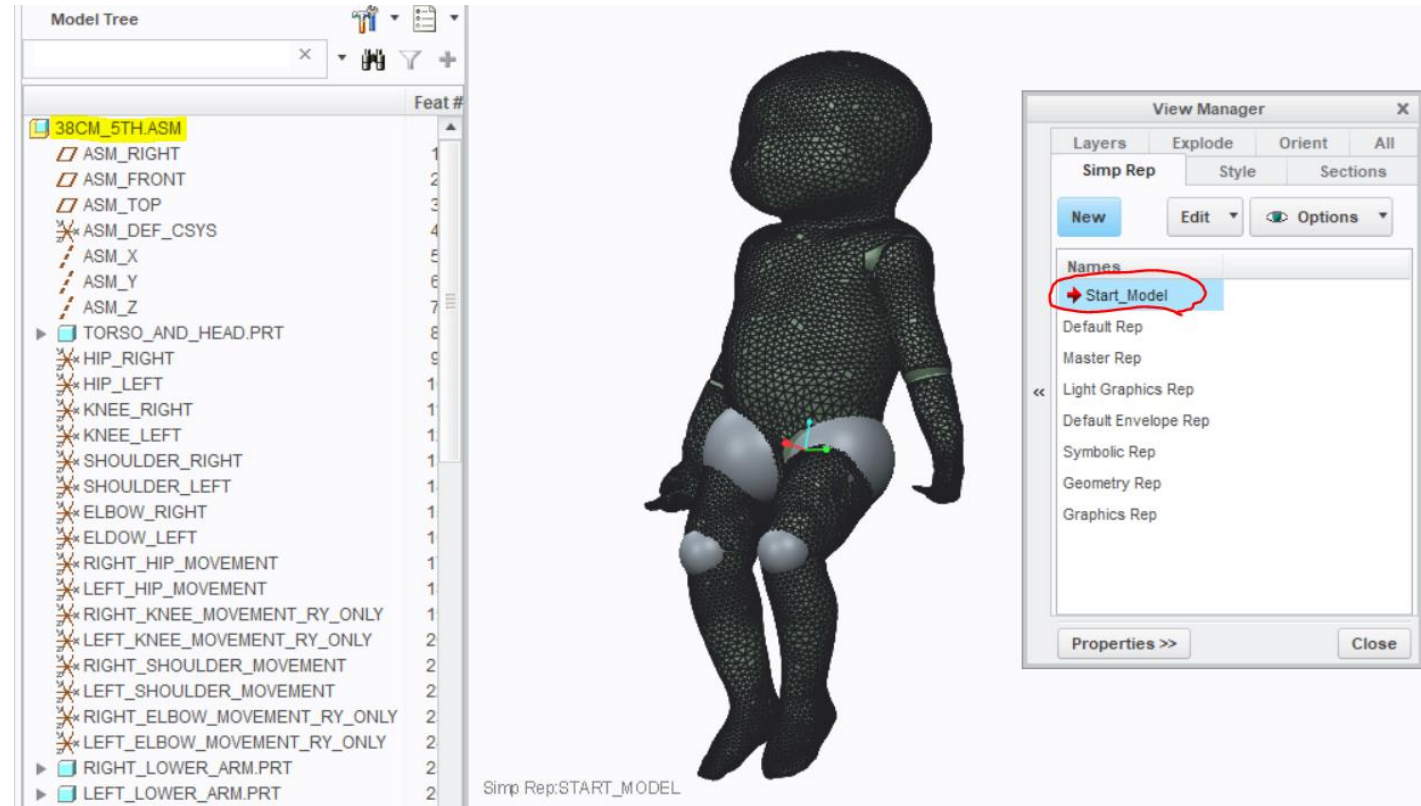Positioning of Preemie CAD model
38cm_5th.asm

Background

- The body surface CAD model representing a 5th percentile premature baby (CAD preemie model) was developed according to Brolin et al. 2024 (IRCOBI conference, Stockholm). In short:

  - The PIPER 1,5-year-old child model was morphed to fit medical imaging of 2-month-old baby. This was done by researchers at the Royal Institute of Technology (KTH) led by Assoc. Prof. Xiaogai Li.

  - The 2-month-old model's body surface and joint's center of rotations for the shoulder, elbow, hip and knees was scaled using the PIPER workflow to represent the 5th, 50th, and 95th percentile preemie anthropometry data from the UK National Health Services Neonatal Networks.

- The 5th percentile preemie CAD model was imported into Creo. It was divided into individual limbs that can be positioned around the skeletal joints' center of rotations.

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1. Open the CAD model in Creo.

2. Two Simplified Representations are defined:
   - "Start_Model" will show the model in its basic, unmodified, state.
   - "Default Rep" will show the model in its positioned state.
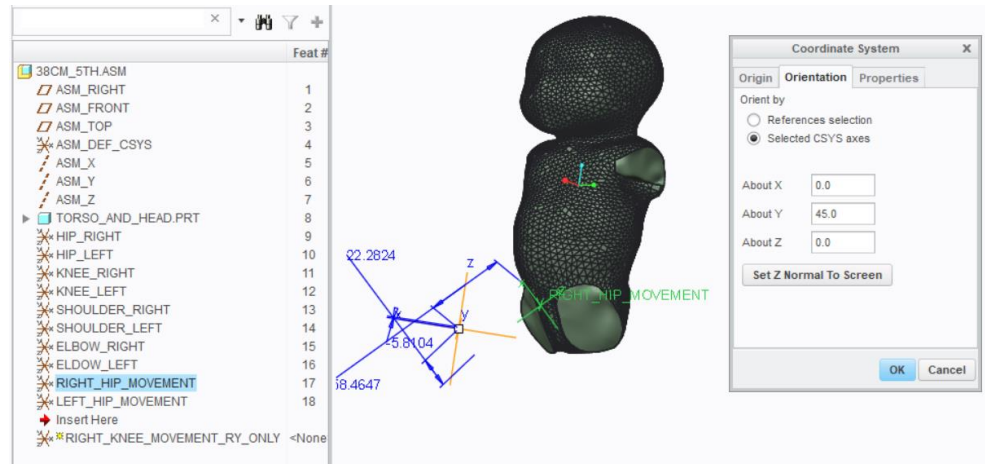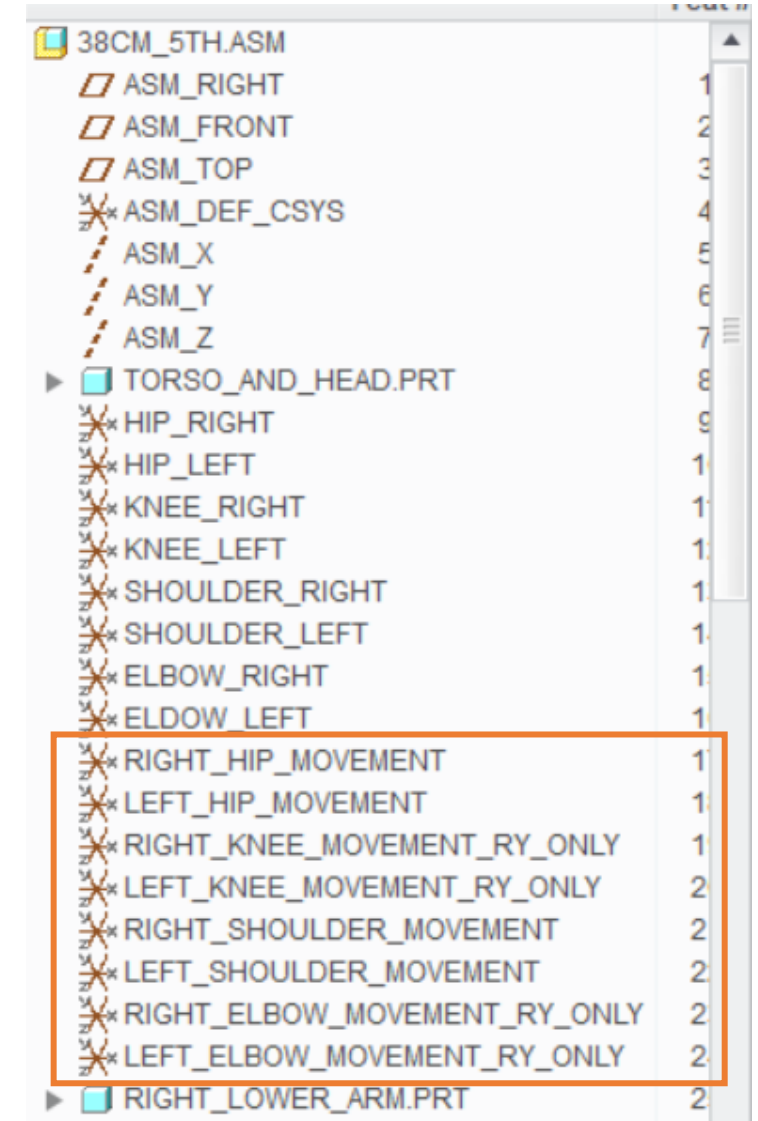
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Positioning the Preemie CAD model

The CAD model is animated using rotations only of the coordinate systems shown to the right (the ones with the word "movement" in their name). Knees and elbows should only bend in the Ry direction (flexion/extension)

Use Creo "Edit Definition"-command to get to the coordinate system dialogue, it is a lot easier than trying to change the values directly on the graphic screen.

Use the dialogue for trying out which way to rotate the coordinate systems for the desired result.

With all angles set to "0" the model will revert to its original state.

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- The only values that need to be changed are the angles in the coordinate systems with "movement" in their names.

- Keep an original copy of the model since no parameters or dimensions are "locked" in it, everything is accessible and can be modified.

- If you need to build a catalogue of babies animated in different positions for reuse in your design process, we recommend building a Creo family table with the rotating angles of the coordinate systems as parameters. Models modified into new positions can then be easily added as the need arises.