

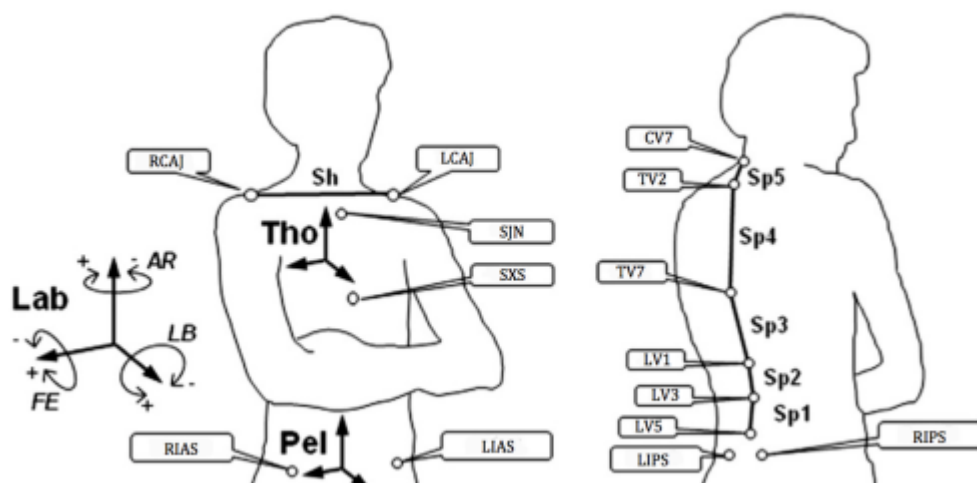
IOR Gait Planar Angles

Overview

This tutorial is a continuation of the [IOR Gait Full Body Tutorial](#). This tutorial goes through computing planar angles with the IOR model, specifically looking at determining how different parts of the spine move relative to one another.

Planar Angles

To calculate the orientation of the trunk segments, planar angles are calculated to determine the orientation of the various segments relative to one another. To calculate a planar angle, you need to either reference the ORIGINAL or PROCESSED folder when defining a target. If your targets have not been filtered or interpolated, you will not have a processed folder and will need to use the ORIGINAL. However, if you plan to process your target data in any way, you should do this now, prior to creating your planar angles.



The following abbreviations are used in naming the planar angles

- **FE** Flexion/Extension
- **LB** Lateral Bending
- **AR** Axial Rotation

Spine FE & LB Landmarks

1. Create RPV_AX:

The screenshot shows the 'RPV_AX' dialog box in the Visual3D software. The 'Landmarks' tab is active. The 'Landmark Name' is 'RPV_AX'. Under 'Define Orientation Using:', 'Starting Point' is 'LV5' (Reference). 'Targets and/or Landmarks' are empty. 'Ending Point' is empty (On a line). '*Lateral object' is empty (On a plane). '*Project From' is empty (Projection onto a line or plane). '* = Optional'. 'Existing Segment' is 'Pelvis'. Under 'Landmark Offset from Start Point (Reference) or Segment Origin', 'Offset to Existing Calibration Target or Landmark' is empty. 'Offset Using the Following ML/AP/AXIAL Offsets' is checked. The offsets are: ML: 0.0, AP: 0.0, AXIAL: -0.05. 'Offset by Percent (1.0 = 100%) (Meters when not checked)' is unchecked. 'Calibration Only Landmark (Not generated for assigned motion file(s))' is unchecked. Buttons at the bottom are 'Undo Changes', 'Apply', 'Build Model', and 'Close Tab'.

1. Click **Landmarks** button
2. Click **Add New Landmark** button
3. Create Landmark: RPV_AX
 - **Landmark Name:** RPV_AX
 - **Define Orientation Using:**
 - **Starting Point:** LV5
4. Offset Using the Following **ML\AP\AXIAL** Offsets:
 - **X:** 0.0 **Y:** 0.0 **Z:** -0.05
5. **Do NOT Check:** Offset by Percent (1.0 = 100%) (Meters when not checked)
6. **Do NOT Check:** Calibration Only Landmark (Not generated for assigned motion file(s))

FE Planar Angles

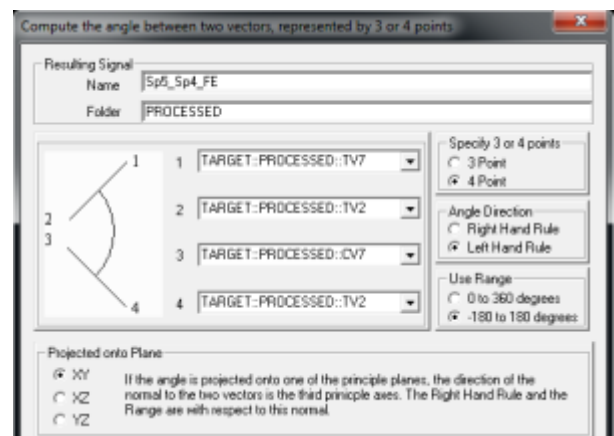
Below defines the orientation (flexion/extension) of the adjoining spine segments resolved in the pelvis coordinate system

NOTE: For the FE Planar Angles, the same definitions for the angles are used for both the left & right side. This means the different sets of signals do not need to be created for the left and right sides (as with the LB and AR planar angles).

NOTE-2: To access these dialogs, you need to edit a command pipeline, the "[Compute_Planar_Angle](#)" pipeline command.

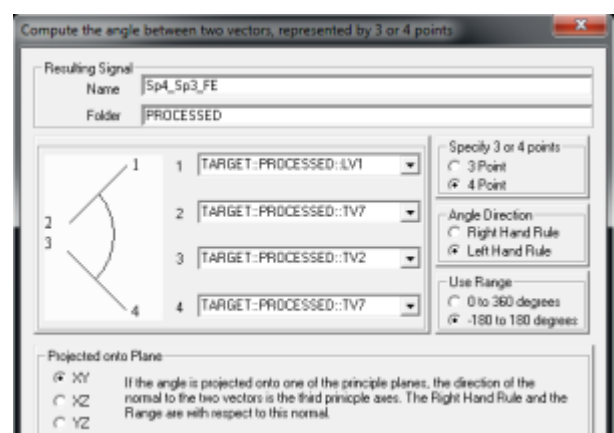
Spine FE Definitions

2. Create Sp5_sp4_FE Planar angle:



1. Define **Resulting Signal** Name: Sp5_Sp4_FE
2. Calculate a **4 point angle** between the following targets:
 1. TARGET::PROCESSED::TV7
 2. TARGET::PROCESSED::TV2
 3. TARGET::PROCESSED::CV7
 4. TARGET::PROCESSED::TV2
 - **Angle Direction:** Left Hand Rule
 - **3D Space:** Always 0 to 180 degrees
 - **Projected onto Plane:** XY
 - **Note:** The Reference segment will need to be changed to RPV within the text option.

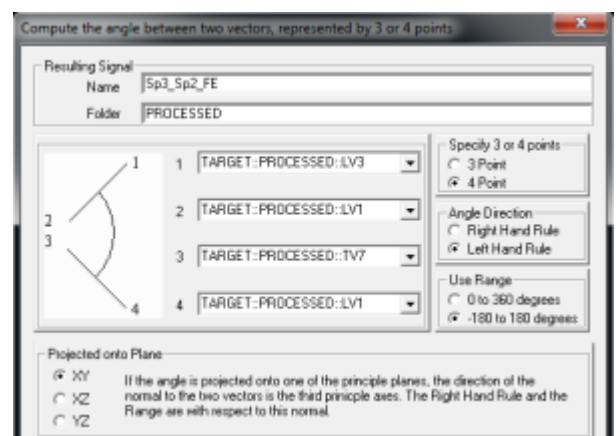
3. Create Sp4_Sp3_FE planar angle:



1. Define **Resulting Signal** Name: Sp4_Sp3_FE
2. Calculate a **4 point angle** between the following
 1. TARGET::PROCESSED::LV1
 2. TARGET::PROCESSED::TV7
 3. TARGET::PROCESSED::TV2
 4. TARGET::PROCESSED::TV7
 - **Angle Direction:** Left Hand Rule

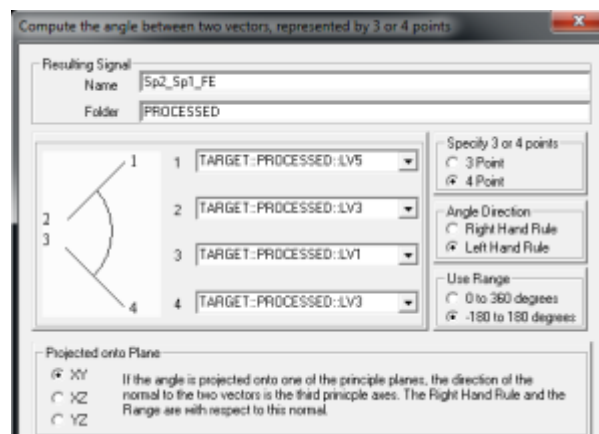
- **3D Space:** Always 0 to 180 degrees
- **Projected onto Plane:** XY
- **Note:** The reference segment will need to be changed to RPV within the text option

4. Create Sp3_Sp2_FE planar angle:



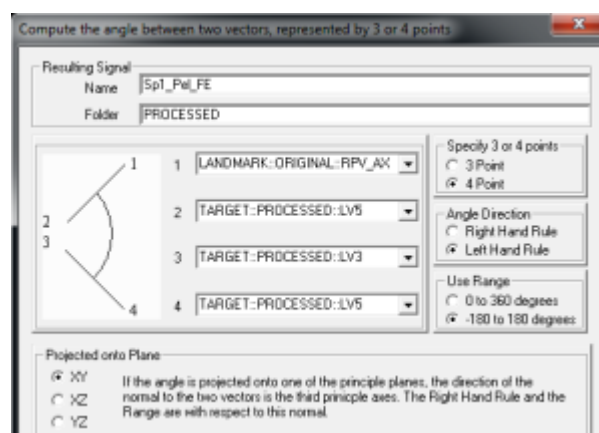
1. Define **Resulting Signal** Name: Sp3_Sp2_FE
2. Calculate a **4 point angle** between the following targets:
 1. TARGET::PROCESSED::LV3
 2. TARGET::PROCESSED::LV1
 3. TARGET::PROCESSED::TV7
 4. TARGET::PROCESSED::LV1
 - **Angle Direction:** Left Hand Rule
 - **3D Space:** Always 0 to 180 degrees
 - **Projected onto Plane:** XY
 - **Note:** The reference segment will need to be changed to RPV within the text option

5. Create Sp2_Sp1_FE planar angle:



1. Define **Resulting Signal** Name: Sp2_Sp1_FE
2. Calculate a **4 point angle** between the following targets:
 1. TARGET::PROCESSED::LV5
 2. TARGET::PROCESSED::LV3
 3. TARGET::PROCESSED::LV1
 4. TARGET::PROCESSED::LV3
 - **Angle Direction:** Left Hand Rule
 - **3D Space:** Always 0 to 180 degrees
 - **Projected onto Plane:** XY
 - **Note:** The reference segment will need to be changed to RPV within the text option.

6. Create Sp1_Pel_FE planar angle:



1. Define **Resulting Signal** Name: Sp2_Sp1_FE
2. Calculate a **4 point angle** between the following targets:
 1. LANDMARK::ORIGINAL::RPV_AX
 2. TARGET::PROCESSED::LV5
 3. TARGET::PROCESSED::LV3

4. TARGET::PROCESSED::LV5

- **Angle Direction:** Left Hand Rule
- **3D Space:** Always 0 to 180 degrees
- **Projected onto Plane:** XY
- **Note:** The reference segment will need to be changed to RPV within the text option.

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