

Virtual Lab Direction of Progression Method 2

This script is explained in the Virtual Lab Direction of Progression tutorial. This script outlines [Method 2](#).

Before running this script:

- A static trial must be loaded into the workspace
- A model template (with modified virtual lab) must be loaded into the workspace
- A dynamic trial must be loaded into the workspace

NOTE: A modified virtual lab follows the same outline as the [Dynamic Virtual Lab](#), except instead of using the Lab_X landmark, the Dir_Prog_X landmark is used. An example of this model template can be found [here](#).

```
** __Add_a_Comment__ **
! /COMMENT= 1. Get the initial position of the origin of the pelvis (RPVo)
;

! Get the position of the pelvis at the start of the trial

Event_Explicit
/EVENT_NAME=TRIAL_START
/FRAME=20
! /TIME=
;

Metric_Signal_Value_At_Event
/RESULT_METRIC_NAME=RPV_START
! /APPLY_AS_SUFFIX_TO_SIGNAL_NAME=FALSE
/RESULT_METRIC_FOLDER=PROG
/SIGNAL_TYPES=KINETIC_KINEMATIC
/SIGNAL_NAMES=CGPos
/SIGNAL_FOLDER=RPV
! /SIGNAL_COMPONENTS=
/COMPONENT_SEQUENCE=ALL
/EVENT_NAME=TRIAL_START
/GENERATE_MEAN_AND_STDDEV=FALSE
! /APPEND_TO_EXISTING_VALUES=FALSE
! /GENERATE_VECTOR_LENGTH_METRIC=FALSE
! /RETAIN_NO_DATA_VALUES=FALSE
;

! Project the pelvis location onto the floor
```

```
Evaluate_Expression
/EXPRESSION=VECTOR ( METRIC::PROG::RPV_START::1 , METRIC::PROG::RPV_START::2
, 0 )
/RESULT_NAME=RPV_START_PROJ
/RESULT_TYPE=METRIC
/RESULT_FOLDER=PROG
;
```

! Create a time based signal from the metric location of the projected pelvis

```
Evaluate_Expression
/EXPRESSION=METRIC::PROG::RPV_START_PROJ * (
(FRAME_NUMBERS::ORIGINAL::FRAMES * 0 + 1 ) )
/RESULT_NAME=RPV_START_VEC
/RESULT_TYPE=DERIVED
/RESULT_FOLDER=PROG
;
```

```
**__Add_a_Comment__**
! /COMMENT=
;
```

! 2. Create a vector from the origin of the pelvis that offset in the -Y direction of the lab (-Y)

```
Evaluate_Expression
/EXPRESSION=( VECTOR ( 0 , -1 , 0 ) * ( (FRAME_NUMBERS::ORIGINAL::FRAMES *
0+1 ) ) ) + DERIVED::PROG::RPV_START_VEC
/RESULT_NAME=RPV_START_VEC_X
/RESULT_TYPE=DERIVED
/RESULT_FOLDER=PROG
;
```

! 3. Project the pelvis origin onto the floor

```
Evaluate_Expression
/EXPRESSION=VECTOR ( KINETIC_KINEMATIC::RPV::PROXENDPOS::X ,
KINETIC_KINEMATIC::RPV::PROXENDPOS::Y , 0 )
/RESULT_NAME=RPV_ORIGIN
/RESULT_TYPE=DERIVED
/RESULT_FOLDER=PROG
;
```

! 4. Calculate the angle between the origin of the pelvis at t=0, the -Y direction of the lab, and the direction of progression (DOP) at each time point in the trial

```
Compute_Planar_Angle
/SIGNAL_TYPES=DERIVED
```

```
/SIGNAL_FOLDER=PROG
/SIGNAL_NAMES=RPV_START_VEC_X+RPV_START_VEC+RPV_ORIGIN
/RESULT_FOLDER=PROG
/RESULT_NAME=RPV_ORIENTATION
! /COMPUTE_3PT_ANGLE=TRUE
! /NORMALX=
! /NORMALY=
! /NORMALZ=
! /REFERENCE_SEGMENT=LAB
! /PROJECTION_PLANE=XY
! /USE_RIGHT_HAND_RULE=TRUE
/USE_0_TO_360_DEGREES=FALSE
;
```

! 5. Calculate the metric direction of progression based on the angle (Theta Y) between the direction of progression and the Y Axis

```
Metric_Median
/RESULT_METRIC_FOLDER=PROG
/RESULT_METRIC_NAME=_MED
/APPLY_AS_SUFFIX_TO_SIGNAL_NAME=TRUE
/SIGNAL_TYPES=DERIVED
/SIGNAL_FOLDER=PROG
/SIGNAL_NAMES=RPV_ORIENTATION
/SIGNAL_COMPONENTS=
/COMPONENT_SEQUENCE=ALL
/EVENT_SEQUENCE=
/EXCLUDE_EVENTS=
! /SEQUENCE_PERCENT_START=0
! /SEQUENCE_PERCENT_END=100
! /GENERATE_MEAN_AND_STDDEV=TRUE
! /APPEND_TO_EXISTING_VALUES=FALSE
;
```

```
** __Add_a_Comment__ **
! /COMMENT= Define the virtual lab based on theta Y
;
```

```
Set_Pipeline_Parameter_From_Expression
/PARAMETER_NAME=ANGLE
/EXPRESSION=GLOBAL::METRIC::PROG::RPV_ORIENTATION_MED_MEAN
! /AS_INTEGER=TRUE
;
```

```
Add_Landmark
/LANDMARK_NAME=Dir_Prog_X
! /CALIBRATION_FILE=
! /USER_GENERATED=TRUE
! /USE_PERCENTAGE=FALSE
! /CALIBRATION_ONLY=FALSE
! /USE_TARGETS=FALSE
```

```
/SEGMENT_NAME=LAB
! /TARGET_TYPES=
! /TARGET_NAMES=
/MCS_ML= - 0.1 * SIN ( ( 90 - &::ANGLE& ) * pi()/180 )
/MCS_AP= - 0.1* COS ( ( 90 - &::ANGLE& ) * pi()/180 )
/MCS_AXIAL=0
! /LANDMARK_LOCATION=
! /REFERENCE_LOCATION_TYPE=
! /REFERENCE_LOCATION_NAME=
! /USE_REFERENCE_LOCATION=FALSE
;

Build_Model
! /CALIBRATION_FILE=
! /REBUILD_ALL_MODELS=FALSE
! /DISPLAY_RESULTS=TRUE
;

Recalc
;
```

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