To use these macros, you will need to have all 6 of the following files in your default directory i.e., the one from which you invoked ADAMS/View (hardcopies of the .cmd and .mac files are included as attachments at the end of this paper.):

```
auto_create_joints.readme
auto_create_joints.cmd
auto_create_joints.mac
auto_create_joints.help
make_joint.mac
make_jprim_mac
```

Step 1. Read the command file `auto_create_joints.cmd` into ADAMS/View. It does the following tasks:

1) reads the file `auto_create_joints.readme` into the ADAMS/View Information Window so user gets some idea of how to execute the macros
2) creates the AUTO-GENERATE menu under CONSTRAINT, CREATE, menu used to display the panel shown in Fig. 1
3) reads in the 3 macro files: `auto_create_joints.mac`, `make_joint.mac`, and `make_jprim_mac`.

Step 2. Use the CONSTRAINT -> CREATE -> AUTO-GENERATE menu under the PREPROCESSING marching menus to display the panel shown in Fig. 1, fill out the fields on the panel and submit it.

```
defaults command_file echo_commands=off update_screen=off

!*****************************************************************
!
! This ADAMS/View command file automatically creates the appropriate
!  ADAMS joint or set of joint_primitives based on the user's
!  specified input of:
!      - the two parts to be connected
!      - the axes along/about which allowable DOF are desired
!      - the location of the constraint(s) to be created
!
!*****************************************************************

info_window set location=-0.8,0.8 width=1.5 height=1.0
info_window read file="auto_create_joints.readme"

macro read macro_name=make_joint  file_name="make_joint.mac"  wrap=yes create=no
macro read macro_name=make_jprim  file_name="make_jprim.mac"  wrap=yes create=no

macro read macro_name=auto_create_joints  file_name="auto_create_joints.mac"  &
  wrap=yes create=yes help_file="auto_create_joints.help"


! *** Add a MENU to the Constraint-Create menus that will display
!     the panel for the 'auto_create_joints' macro

menu create                                          &
  menu_name=.gui.pre_con_cre                                 &
  row=1                                            &
  label="AUTO-GENERATE"                                    &
  command_string="panel display panel=.gui.macro_auto_create_joints"


! *** Change FIELDS on custom panel

panel delete field_name=.gui.macro_auto_create_joints.f_default_model_name

panel modify field                                   &
  field_name=.gui.macro_auto_create_joints.f_I_part_name          &
  string_location= -0.985,0.05                             &
  value_location= -0.85,0.00                               &
  length=18

panel modify field                                   &
  field_name=.gui.macro_auto_create_joints.f_J_part_name          &
  string_location= -0.985,-0.40                            &
  value_location= -0.85,-0.47                              &
  length=18
```

auto_create_joints.cmd *(2 of 3)*

```
panel modify field                                    &
  field_name=.gui.macro_auto_create_joints.f_Translational_DOF_allowed_along&
  string_location= 0.255,0.25                         &
  value_location= 0.705,0.18                          &
  length=13

panel modify field                                    &
  field_name=.gui.macro_auto_create_joints.f_Rotational_DOF_allowed_about   &
  string_location= 0.255,-0.21                        &
  value_location= 0.705,-0.27                         &
  length=13

panel modify field                                    &
  field_name=.gui.macro_auto_create_joints.f_Location             &
  string_location= 0.255,-0.65                        &
  value_location= 0.385,-0.72                         &
  length=33


! *** Change BUTTONS on custom panel

panel delete button_name=.gui.macro_auto_create_joints.VVAR

panel create button                                   &
  button_name=.gui.macro_auto_create_joints.but_def_CS    &
  label_string="set a new Default Coordinate System"      &
  location= -0.42,-0.11                               &
  command_string="panel display panel=.gui.glo_def_coo"


! *** Change TEXT on custom panel

panel modify text                                     &
  text_name=.gui.macro_auto_create_joints.c1                    &
  new_text_name=.gui.macro_auto_create_joints.tex_header          &
  string="AUTO-GENERATE JOINTS BY SPECIFYING ALLOWABLE DEGREES OF
FREEDOM" &
  location= -0.95,0.7

panel create text                                     &
  text_name=.gui.macro_auto_create_joints.tex_explanatory1        &
  string="Select this button to"                      &
  location= -0.27,0.29

panel create text                                     &
  text_name=.gui.macro_auto_create_joints.tex_explanatory2        &
  string="that will be used to define axes and location"          &
  location= -0.41,-0.38
```

auto_create_joints.cmd *(2 of 3)*

```
panel create text                                    &
  text_name=.gui.macro_auto_create_joints.tex_explanatory3        &
  string="(or else the current Default Coord. Sys. will be used)"    &
  location= -0.46,-0.75

panel create text                                    &
  text_name=.gui.macro_auto_create_joints.arrows1                 &
  string="-->"                                       &
  location= 0.16,-0.36


! *** Add BUTTON on standard Defaults-Coordinate_System panel

panel create button                                  &
  button_name=.gui.glo_def_coo.but_marker                         &
  label_string="MARKER"                                  &
  location=0.25,0.75                                 &
  command_string="panel display panel_name=.gui.pre_mar_cre"
```

auto_create_joints.cmd *(3 of 3)*

```
! $I_part_name:                t=part:     c=1
! $J_part_name:                t=part:     c=1
! $Translational_DOF_allowed_along:t=list(X_and_Y_and_Z,X_and_Y,Y_and_Z,Z_and_X,X_only,Y_only,Z_only,NONE): &
d=X_and_Y_and_Z
! $Rotational_DOF_allowed_about:  t=list(X_and_Y_and_Z,X_and_Y,Y_and_Z,Z_and_X,X_only,Y_only,Z_only,NONE): &
d=X_and_Y_and_Z
! $Location:                  t=location
!
! $default_model_name:          t=model:    a
!
!
variable create variable=$default_model_name.tmp_tran_axes                    &
  string=$Translational_DOF_allowed_along
variable create variable=$default_model_name.tmp_rot_axes                     &
  string=$Rotational_DOF_allowed_about

defaults orient_axis_and_plane axis_and_plane_setting=z_axis_zx_plane


!==============================================================================
!  0 Translational DOF Allowed
!==============================================================================
IF CONDITION=((tmp_tran_axes) == "NONE")

! *** Make a Spherical Joint
  IF CONDITION=((tmp_rot_axes) == "X_and_Y_and_Z")
    make_joint type=SPHERICAL i_part=$I_part_name j_part=$J_part_name loc=$Location        &
     IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
  END
!------------------------------------------------------

! *** Make a Universal (i.e., ADAMS Hooke) Joint
  IF CONDITION=((tmp_rot_axes) == "X_and_Y")
    make_joint type=HOOKE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
     IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
  END
  IF CONDITION=((tmp_rot_axes) == "Y_and_Z")
    make_joint type=HOOKE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
     IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
  END
  IF CONDITION=((tmp_rot_axes) == "Z_and_X")
    make_joint type=HOOKE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
     IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
  END
!------------------------------------------------------

! *** Make a Revolute Joint
  IF CONDITION=((tmp_rot_axes) == "X_only")
    make_joint type=REVOLUTE i_part=$I_part_name j_part=$J_part_name loc=$Location        &
     IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
  END
  IF CONDITION=((tmp_rot_axes) == "Y_only")
    make_joint type=REVOLUTE i_part=$I_part_name j_part=$J_part_name loc=$Location        &
     IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
  END
  IF CONDITION=((tmp_rot_axes) == "Z_only")
    make_joint type=REVOLUTE i_part=$I_part_name j_part=$J_part_name loc=$Location        &
     IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
  END
!------------------------------------------------------

! *** Make a Fixed Joint
  IF CONDITION=((tmp_rot_axes) == "NONE")
    make_joint type=FIXED i_part=$I_part_name j_part=$J_part_name loc=$Location          &
     IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
  END

END
```

```
!=============================================================================
! 1 Translational DOF Allowed
!=============================================================================
IF CONDITION=((tmp_tran_axes) == "X_only")

! *** Make an InLine Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_and_Y_and_Z")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
 END

! *** Make an InLine Joint Primitive + a Perpendicular_Axes Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_and_Y")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location    &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=1
 END
 IF CONDITION=((tmp_rot_axes) == "Y_and_Z")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location    &
   IPO4=0 IPO5=0 IPO6=1 IPO7=-1 IPO8=0 IPO9=0
 END
 IF CONDITION=((tmp_rot_axes) == "Z_and_X")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location    &
   IPO4=0 IPO5=0 IPO6=1 IPO7=0 IPO8=1 IPO9=0
 END

! *** Make a Cylindrical Joint if Tran. and Rot. DOF are same axis ...
!     ... otherwise make an InLine Joint Primitive + a Parallel_Axes Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_only")
  make_joint type=CYLINDRICAL i_part=$I_part_name j_part=$J_part_name loc=$Location     &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
 END
 IF CONDITION=((tmp_rot_axes) == "Y_only")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
  make_jprim type=PARALLEL i_part=$I_part_name j_part=$J_part_name loc=$Location        &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
 END
 IF CONDITION=((tmp_rot_axes) == "Z_only")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
  make_jprim type=PARALLEL i_part=$I_part_name j_part=$J_part_name loc=$Location        &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
 END

! *** Make a Translational Joint
 IF CONDITION=((tmp_rot_axes) == "NONE")
  make_joint type=TRANSLATIONAL i_part=$I_part_name j_part=$J_part_name loc=$Location    &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
 END

END
!-----------------------------------------------------------
```

```
IF CONDITION=((tmp_tran_axes) == "Y_only")

! *** Make an InLine Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_and_Y_and_Z")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
 END

! *** Make an InLine Joint Primitive + a Perpendicular_Axes Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_and_Y")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location    &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=1
 END
 IF CONDITION=((tmp_rot_axes) == "Y_and_Z")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location    &
   IPO4=0 IPO5=0 IPO6=1 IPO7=-1 IPO8=0 IPO9=0
 END
 IF CONDITION=((tmp_rot_axes) == "Z_and_X")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location    &
   IPO4=0 IPO5=0 IPO6=1 IPO7=0 IPO8=1 IPO9=0
 END

! *** Make a Cylindrical Joint if Tran. and Rot. DOF are same axis ...
!     ... otherwise make an InLine Joint Primitive + a Parallel_Axes Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_only")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PARALLEL i_part=$I_part_name j_part=$J_part_name loc=$Location        &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
 END
 IF CONDITION=((tmp_rot_axes) == "Y_only")
   make_joint type=CYLINDRICAL i_part=$I_part_name j_part=$J_part_name loc=$Location     &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
 END
 IF CONDITION=((tmp_rot_axes) == "Z_only")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PARALLEL i_part=$I_part_name j_part=$J_part_name loc=$Location        &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
 END

! *** Make a Translational Joint
 IF CONDITION=((tmp_rot_axes) == "NONE")
  make_joint type=TRANSLATIONAL i_part=$I_part_name j_part=$J_part_name loc=$Location    &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
 END

END
!-----------------------------------------------
```

auto_create_joints.mac *(3 of 8)*

```
IF CONDITION=((tmp_tran_axes) == "Z_only")

! *** Make an InLine Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_and_Y_and_Z")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
 END

! *** Make an InLine Joint Primitive + a Perpendicular_Axes Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_and_Y")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location    &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=1
 END
 IF CONDITION=((tmp_rot_axes) == "Y_and_Z")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location    &
   IPO4=0 IPO5=0 IPO6=1 IPO7=-1 IPO8=0 IPO9=0
 END
 IF CONDITION=((tmp_rot_axes) == "Z_and_X")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location    &
   IPO4=0 IPO5=0 IPO6=1 IPO7=0 IPO8=1 IPO9=0
 END

! *** Make a Cylindrical Joint if Tran. and Rot. DOF are same axis ...
!     ... otherwise make an InLine Joint Primitive + a Parallel_Axes Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_only")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PARALLEL i_part=$I_part_name j_part=$J_part_name loc=$Location        &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
 END
 IF CONDITION=((tmp_rot_axes) == "Y_only")
  make_jprim type=INLINE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PARALLEL i_part=$I_part_name j_part=$J_part_name loc=$Location        &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
 END
 IF CONDITION=((tmp_rot_axes) == "Z_only")
   make_joint type=CYLINDRICAL i_part=$I_part_name j_part=$J_part_name loc=$Location    &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
 END

! *** Make a Translational Joint
 IF CONDITION=((tmp_rot_axes) == "NONE")
  make_joint type=TRANSLATIONAL i_part=$I_part_name j_part=$J_part_name loc=$Location    &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
 END

END
!-------------------------------------------------
```

```
!

!=============================================================================
! 2 Translational DOF Allowed
!=============================================================================
IF CONDITION=((tmp_tran_axes) == "X_and_Y")

! *** Make an InPlane Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_and_Y_and_Z")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
 END

! *** Make an InPlane Joint Primitive + a Perpendicular_Axes Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_and_Y")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location      &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=1
 END
 IF CONDITION=((tmp_rot_axes) == "Y_and_Z")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location      &
   IPO4=0 IPO5=0 IPO6=1 IPO7=-1 IPO8=0 IPO9=0
 END
 IF CONDITION=((tmp_rot_axes) == "Z_and_X")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location      &
   IPO4=0 IPO5=0 IPO6=1 IPO7=0 IPO8=1 IPO9=0
 END

! *** Make a Planar Joint if Tran. and Rot. DOF are all different axes ...
!     ... otherwise make an InPlane Joint Primitive + a Parallel_Axes Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_only")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PARALLEL i_part=$I_part_name j_part=$J_part_name loc=$Location         &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
 END
 IF CONDITION=((tmp_rot_axes) == "Y_only")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PARALLEL i_part=$I_part_name j_part=$J_part_name loc=$Location         &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
 END
 IF CONDITION=((tmp_rot_axes) == "Z_only")
  make_joint type=PLANAR i_part=$I_part_name j_part=$J_part_name loc=$Location           &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
 END

! *** Make an InPlane Joint Primitive + an Orientation Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "NONE")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=ORIENTATION i_part=$I_part_name j_part=$J_part_name loc=$Location       &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
 END

END
!-----------------------------------------------------
```

```
IF CONDITION=((tmp_tran_axes) == "Y_and_Z")

! *** Make an InPlane Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_and_Y_and_Z")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
 END

! *** Make an InPlane Joint Primitive + a Perpendicular_Axes Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_and_Y")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location      &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=1
 END
 IF CONDITION=((tmp_rot_axes) == "Y_and_Z")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location      &
   IPO4=0 IPO5=0 IPO6=1 IPO7=-1 IPO8=0 IPO9=0
 END
 IF CONDITION=((tmp_rot_axes) == "Z_and_X")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location      &
   IPO4=0 IPO5=0 IPO6=1 IPO7=0 IPO8=1 IPO9=0
 END

! *** Make a Planar Joint if Tran. and Rot. DOF are all different axes ...
!     ... otherwise make an InPlane Joint Primitive + a Parallel_Axes Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_only")
  make_joint type=PLANAR i_part=$I_part_name j_part=$J_part_name loc=$Location           &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
 END
 IF CONDITION=((tmp_rot_axes) == "Y_only")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
  make_jprim type=PARALLEL i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
 END
 IF CONDITION=((tmp_rot_axes) == "Z_only")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
  make_jprim type=PARALLEL i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
 END

! *** Make an InPlane Joint Primitive + an Orientation Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "NONE")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
  make_jprim type=ORIENTATION i_part=$I_part_name j_part=$J_part_name loc=$Location       &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
 END

END
!-------------------------------------------------
```

```
IF CONDITION=((tmp_tran_axes) == "Z_and_X")

! *** Make an InPlane Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_and_Y_and_Z")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
 END

! *** Make an InPlane Joint Primitive + a Perpendicular_Axes Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_and_Y")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location      &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=1
 END
 IF CONDITION=((tmp_rot_axes) == "Y_and_Z")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location      &
   IPO4=0 IPO5=0 IPO6=1 IPO7=-1 IPO8=0 IPO9=0
 END
 IF CONDITION=((tmp_rot_axes) == "Z_and_X")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location      &
   IPO4=0 IPO5=0 IPO6=1 IPO7=0 IPO8=1 IPO9=0
 END

! *** Make a Planar Joint if Tran. and Rot. DOF are all different axes ...
!     ... otherwise make an InPlane Joint Primitive + a Parallel_Axes Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_only")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PARALLEL i_part=$I_part_name j_part=$J_part_name loc=$Location         &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
 END
 IF CONDITION=((tmp_rot_axes) == "Y_only")
  make_joint type=PLANAR i_part=$I_part_name j_part=$J_part_name loc=$Location           &
  IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
 END
 IF CONDITION=((tmp_rot_axes) == "Z_only")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=PARALLEL i_part=$I_part_name j_part=$J_part_name loc=$Location         &
    IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
 END

! *** Make an InPlane Joint Primitive + an Orientation Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "NONE")
  make_jprim type=INPLANE i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
  make_jprim type=ORIENTATION i_part=$I_part_name j_part=$J_part_name loc=$Location       &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
 END

END
!-------------------------------------------------
```

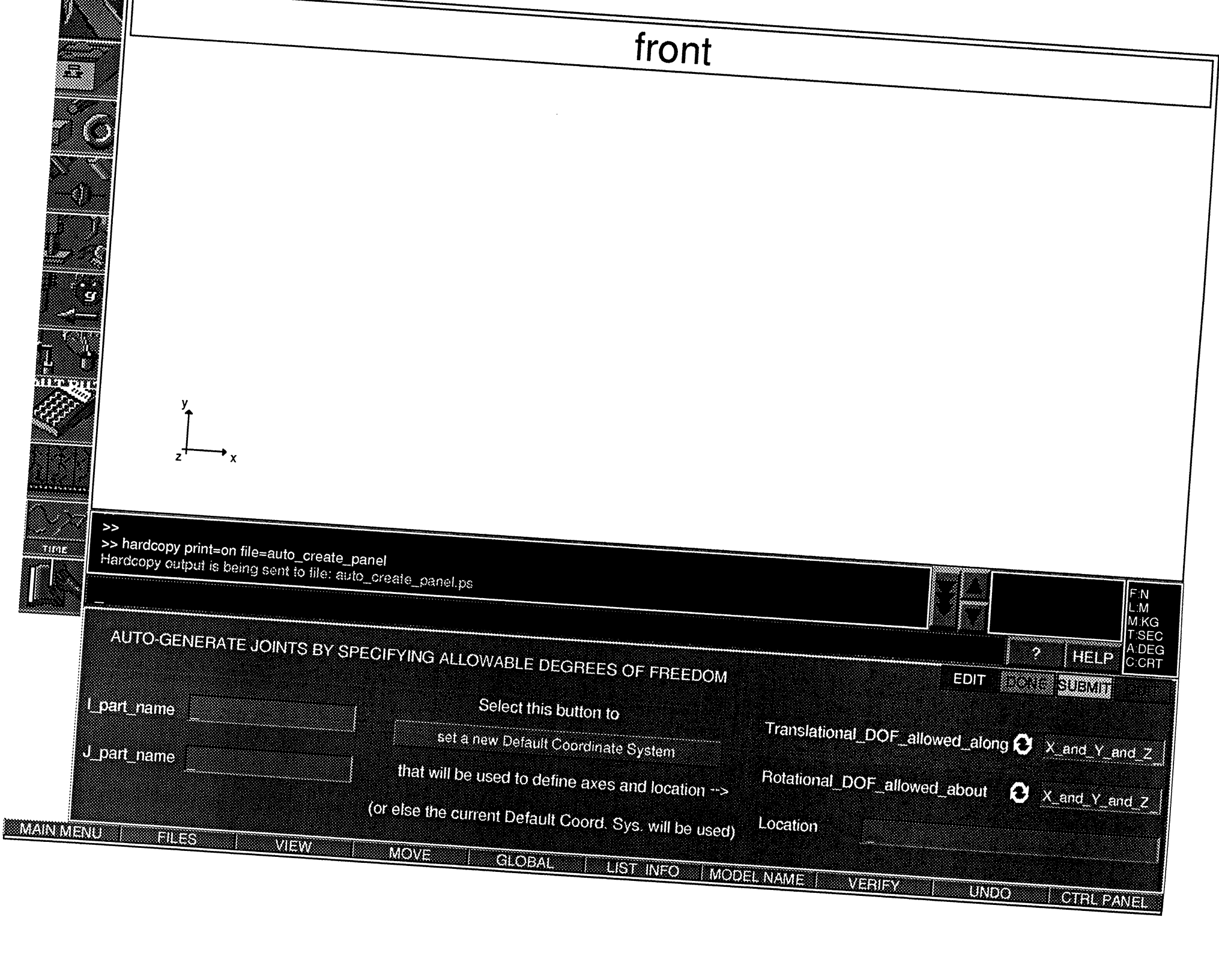
```
!=============================================================================
! 3 Translational DOF Allowed
!=============================================================================
IF CONDITION=((tmp_tran_axes) == "X_and_Y_and_Z")

! *** Make nothing
 IF CONDITION=((tmp_rot_axes) == "X_and_Y_and_Z")
 END

! *** Make a Perpendicular_Axes Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_and_Y")
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location      &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=1
 END
 IF CONDITION=((tmp_rot_axes) == "Y_and_Z")
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location      &
   IPO4=0 IPO5=0 IPO6=1 IPO7=-1 IPO8=0 IPO9=0
 END
 IF CONDITION=((tmp_rot_axes) == "Z_and_X")
  make_jprim type=PERPENDICULAR i_part=$I_part_name j_part=$J_part_name loc=$Location      &
   IPO4=0 IPO5=0 IPO6=1 IPO7=0 IPO8=1 IPO9=0
 END

! *** Make a Parallel_Axes Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "X_only")
  make_jprim type=PARALLEL i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=1 IPO5=0 IPO6=0 IPO7=0 IPO8=0 IPO9=-1
 END
 IF CONDITION=((tmp_rot_axes) == "Y_only")
  make_jprim type=PARALLEL i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=1 IPO6=0 IPO7=1 IPO8=0 IPO9=0
 END
 IF CONDITION=((tmp_rot_axes) == "Z_only")
  make_jprim type=PARALLEL i_part=$I_part_name j_part=$J_part_name loc=$Location          &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
 END

! *** Make an Orientation Joint Primitive
 IF CONDITION=((tmp_rot_axes) == "NONE")
  make_jprim type=ORIENTATION i_part=$I_part_name j_part=$J_part_name loc=$Location       &
   IPO4=0 IPO5=0 IPO6=1 IPO7=1 IPO8=0 IPO9=0
 END

END
!=============================================================================


variable delete variable=tmp_tran_axes
variable delete variable=tmp_rot_axes
```

```
! $type_of_joint:          t=string
! $I_part_name:            t=part:    c=1
! $J_part_name:            t=part:    c=1
! $Location:               t=location
! $IPO4:                   t=real:    d=0.0
! $IPO5:                   t=real:    d=0.0
! $IPO6:                   t=real:    d=1.0
! $IPO7:                   t=real:    d=1.0
! $IPO8:                   t=real:    d=0.0
! $IPO9:                   t=real:    d=0.0
!
! $default_model_name:      t=model:    a
!
variable create variable_name=$default_model_name.tmp_jointname    &
string=(UNIQUE_NAME("JOI"))

variable create variable_name=$default_model_name.tmp_dv1 real=$IPO4
variable create variable_name=$default_model_name.tmp_dv2 real=$IPO5
variable create variable_name=$default_model_name.tmp_dv3 real=$IPO6
variable create variable_name=$default_model_name.tmp_dv4 real=$IPO7
variable create variable_name=$default_model_name.tmp_dv5 real=$IPO8
variable create variable_name=$default_model_name.tmp_dv6 real=$IPO9

constraint create joint $type_of_joint    &
 joint_name=(EVAL(tmp_jointname))      &
 i_part_name=$I_part_name              &
 j_part_name=$J_part_name              &
 location=$Location                    &
 in_plane_orientation=0,0,0, (tmp_dv1),(tmp_dv2),(tmp_dv3),  &
(tmp_dv4),(tmp_dv5),(tmp_dv6)

variable delete variable_name=$default_model_name.tmp_jointname

variable delete variable_name=$default_model_name.tmp_dv1
variable delete variable_name=$default_model_name.tmp_dv2
variable delete variable_name=$default_model_name.tmp_dv3
variable delete variable_name=$default_model_name.tmp_dv4
variable delete variable_name=$default_model_name.tmp_dv5
variable delete variable_name=$default_model_name.tmp_dv6
```

make_joint.mac

```
! $type_of_jprim:          t=string
! $I_part_name:            t=part:    c=1
! $J_part_name:            t=part:    c=1
! $Location:               t=location
! $IPO4:                   t=real:    d=0.0
! $IPO5:                   t=real:    d=0.0
! $IPO6:                   t=real:    d=1.0
! $IPO7:                   t=real:    d=1.0
! $IPO8:                   t=real:    d=0.0
! $IPO9:                   t=real:    d=0.0
!
! $default_model_name:      t=model:   a
!
variable create variable_name=$default_model_name.tmp_jprimname
string=(UNIQUE_NAME("JPR"))

variable create variable_name=$default_model_name.tmp_dv1 real=$IPO4
variable create variable_name=$default_model_name.tmp_dv2 real=$IPO5
variable create variable_name=$default_model_name.tmp_dv3 real=$IPO6
variable create variable_name=$default_model_name.tmp_dv4 real=$IPO7
variable create variable_name=$default_model_name.tmp_dv5 real=$IPO8
variable create variable_name=$default_model_name.tmp_dv6 real=$IPO9

constraint create primitive_joint $type_of_jprim    &
 jprim_name=(EVAL(tmp_jprimname))              &
 i_part_name=$I_part_name                      &
 j_part_name=$J_part_name                      &
 location=$Location                        &
 in_plane_orientation=0,0,0, (tmp_dv1),(tmp_dv2),(tmp_dv3),
(tmp_dv4),(tmp_dv5),(tmp_dv6) &

variable delete variable_name=$default_model_name.tmp_jprimname

variable delete variable_name=$default_model_name.tmp_dv1
variable delete variable_name=$default_model_name.tmp_dv2
variable delete variable_name=$default_model_name.tmp_dv3
variable delete variable_name=$default_model_name.tmp_dv4
variable delete variable_name=$default_model_name.tmp_dv5
variable delete variable_name=$default_model_name.tmp_dv6
```

make_jprim.mac


front
y
z
x
>>
>> hardcopy print=on file=auto_create_panel
Hardcopy output is being sent to file: auto_create_panel.ps
F:N
L:M
M:KG
T:SEC
A:DEG
C:CRT
?
HELP
AUTO-GENERATE JOINTS BY SPECIFYING ALLOWABLE DEGREES OF FREEDOM
EDIT
CONF
SUBMIT
I_part_name
J_part_name
Select this button to
set a new Default Coordinate System
that will be used to define axes and location -->
(or else the current Default Coord. Sys. will be used)
Translational_DOF_allowed_along
X_and_Y_and_Z
Rotational_DOF_allowed_about
X_and_Y_and_Z
Location
MAIN MENU
FILES
VIEW
MOVE
GLOBAL
LIST INFO
MODEL NAME
VERIFY
UNDO
CTRL PANEL