```
//__________________________________________________________
//  1.- FrameSetup_mode0
//---------------------------------------------------
// The label 'mode' does not refer to a deformation but to a setup type.
// It accepts changes in "ksp_probe" and "bending_stiffness_probe".
// It resets the mechanical properties of the frame.
// It keeps the original geometry (and length0).

FrameSetup_mode0:={

nematic_energy.modulus:=1;
ksp_probe:=ksp_peptide;
bending_stiffness_probe:=ksp_peptide;

set_special_attributes_frame; //It is defined in "PS_models.txt".

SpringNetwork_frame; //It is defined in "PS_models.txt".
                    //It upload the mechanical properties of the frame.

}//_________________________________________________________


//__________________________________________________________
//  2.- FrameSetup_mode1
//---------------------------------------------------
// The label 'mode' does not refer to a deformation but to a setup type.
// It accepts changes in "ksp_probe" and "bending_stiffness_probe".
// It resets the mechanical properties of the frame.
// The frame associated springs are re-aligned and length0 is updated (length0=length).
// The head positions of the frame associated springs (perpendicular coordinate) are CONSERVED.

FrameSetup_mode1:={

nematic_energy.modulus:=1;
ksp_probe:=ksp_peptide;
bending_stiffness_probe:=ksp_peptide;

set_special_attributes_frame; //It is defined in "PS_models.txt".

reset_geometry_frame_1; //It is defined in "PS_loading.txt".
   //springs are re-aligned.
         //head positions (perpendicular coordinate) are conserved.

reset_SpringNetwork_frame; //It is defined in "PS_models.txt".
}//_________________________________________________________


//__________________________________________________________
//  3.- FrameSetup_mode2
//---------------------------------------------------
// It accepts changes in "ksp_probe" and "bending_stiffness_probe".
// It resets the mechanical properties of the frame.
// The frame associated springs are re-aligned and length0 is updated (length0=length).
// The head positions of the frame associated springs are all moved to make the spring length 1.0.
```

```
FrameSetup_mode2:={

nematic_energy.modulus:=1;
ksp_probe:=1000*ksp_peptide;
bending_stiffness_probe:=1000*ksp_peptide;

set_special_attributes_frame; //It is defined in "PS_models.txt".

reset_geometry_frame_2; //It is defined in "PS_loading.txt".
  //The springs associated to the frame a re-aligned.
        //The head positions of the frame springs are all set in order to make the spring length constant
(default value 1.0).

reset_SpringNetwork_frame; //It is defined in "PS_models.txt".
}//____________________________________________________


//____________________________________________________
//  4.- set_referential_state
//---------------------------------------------------
// The parameter "config_number" must be defined already.

set_referential_state:={
config_directories; //It is defined in "config_directories.txt".
      //Its output is the array named: "directory".

replace_load directory[1+config_number]; // With "replace_load" all variables, constraints, quantities,
                                          // and commands from the previous file are remembered, although
                                          // they may be re-initialized in the top of the new datafile.
                                          // Also, the attributes of the different elements are reset.
MultiSteps_info; //It is defined in "PS_commands.txt".
SpringNetwork_PG; //It is defined in "PS_models.txt".
FrameSetup_mode0;
ColorMaker;
loading_test; //It is defined in "PS_loading.txt".

Calc_boundary_geometry;
Lx_ref:=size_x;
Ly_ref:=size_y;
set vertex x_ref x;
set vertex y_ref y;
Calc_strain_stress_referential;

Calc_G_tensor_boundary;
G_tensor_boundary_ref:=G_tensor_boundary; //It must be always very close to the identity matrix.

Calc_sigma_tensor;
sigma_tensor_ref:=sigma_tensor; //It must be always very close to a diagonal matrix.
}//____________________________________________________

//____________________________________________________
//  5.- run_deformation_mode0
//---------------------------------------------------
// Now the label 'mode' DOES refer to deformation modes.
```

```
run_deformation_mode0:={
deformation_mode:=0;
G_tensor_frame[1][1]:=1.0;
G_tensor_frame[1][2]:=0.0;
G_tensor_frame[2][1]:=0.0;
G_tensor_frame[2][2]:=1.0;

G_deformation_global;
loading_test;
CalcEnergies_LS;
Calc_G_tensor_boundary;
Calc_sigma_tensor;
save_moduli_info;
}//___________________________________________________


//___________________________________________________
//  6.- run_deformation_mode1
//--------------------------------------------------
// The network patch is deformed in the x-direction, only.
run_deformation_mode1:={
deformation_mode:=1;
mu:=G_tensor_boundary[1][1]-G_tensor_boundary_ref[1][1];
while  mu <= strain_step do {
                    G_tensor_frame[1][1]:=G_tensor_frame[1][1]+incremental_strain_magnitude;
                    G_deformation_global;
                    loading_test;
                    CalcEnergies_LS;
                    Calc_G_tensor_boundary;
                    Calc_sigma_tensor;
                    save_moduli_info;
      mu:=G_tensor_boundary[1][1]-G_tensor_boundary_ref[1][1];
     }; G_tensor_frame[1][1]:=1.0;

}//___________________________________________________


//___________________________________________________
//  7.- run_deformation_mode2
//--------------------------------------------------
// The network patch will be deformed with a shear xy.
run_deformation_mode2:={
deformation_mode:=2;
mu:=G_tensor_boundary[1][2]-G_tensor_boundary_ref[1][2];
while  mu <= strain_step do {
                    G_tensor_frame[1][2]:=G_tensor_frame[1][2]+incremental_strain_magnitude;
                    G_deformation_global;
                    loading_test;
                    CalcEnergies_LS;
                    Calc_G_tensor_boundary;
                    Calc_sigma_tensor;
                    save_moduli_info;
      mu:=G_tensor_boundary[1][2]-G_tensor_boundary_ref[1][2];
     }; G_tensor_frame[1][2]:=0.0;
```

```
}//________________________________________________________________


//________________________________________________________________
//  8.- run_deformation_mode3
//--------------------------------------------------
// The network patch will be deformed with a shear yx.
run_deformation_mode3:={
deformation_mode:=3;
mu:=G_tensor_boundary[2][1]-G_tensor_boundary_ref[2][1];
while  mu <= strain_step do {
                    G_tensor_frame[2][1]:=G_tensor_frame[2][1]+incremental_strain_magnitude;
                    G_deformation_global;
                    loading_test;
                    CalcEnergies_LS;
                    Calc_G_tensor_boundary;
                    Calc_sigma_tensor;
                    save_moduli_info;
      mu:=G_tensor_boundary[2][1]-G_tensor_boundary_ref[2][1];
     }; G_tensor_frame[2][1]:=0.0;

}//________________________________________________________________


//________________________________________________________________
//  9.- run_deformation_mode4
//--------------------------------------------------
// The network patch is deformed in the y-direction, only.
run_deformation_mode4:={
deformation_mode:=4;
mu:=G_tensor_boundary[2][2]-G_tensor_boundary_ref[2][2];
while  mu <= strain_step do {
                    G_tensor_frame[2][2]:=G_tensor_frame[2][2]+incremental_strain_magnitude;
                    G_deformation_global;
                    loading_test;
                    CalcEnergies_LS;
                    Calc_G_tensor_boundary;
                    Calc_sigma_tensor;
                    save_moduli_info;
      mu:=G_tensor_boundary[2][2]-G_tensor_boundary_ref[2][2];
     }; G_tensor_frame[2][2]:=1.0;

}//________________________________________________________________


//________________________________________________________________
//  10.- stiffness_test
//--------------------------------------------------
stiffness_test:={
config_number:=1;

set_special_attributes_frame; //It is defined in "PS_models.txt".
CalcGeometry; //It is defined in "PS_calc.txt".
Lx0:=Lx; Ly0:=Ly;
```

```
set_referential_state;

incremental_strain_magnitude:=0.0025;
strain_step:=0.10;

run_deformation_mode0;
run_deformation_mode1;
run_deformation_mode2;
run_deformation_mode3;
run_deformation_mode4;

}//_____________________________________________________
```