```matlab
function  [ out ] = get_materialHysteresis( matDef, inputData, numIncr, localOpenSeesPath )
%% DESCRIPTION

% INPUT
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% matDef            : material definition string from OpenSees
% inputData         : a vector of input deformation/strain time history
% numIncr           : num of points to include between inputData(i) and inputData(i+1)
% localOpenSeesPath : full path to OpenSees executable

% OUTPUT
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% out               : [deformation force] or [strain stress]

%% Function
[matDef, localOpenSeesPath] = convertStringsToChars(matDef, localOpenSeesPath);
inputData = arrayfun(@(x) num2str(x), inputData, 'UniformOutput', 0);
temp = strsplit(matDef);
matTag = temp{3};

materialTesterFid = fopen('matTest.tcl','w+');
fprintf(materialTesterFid,['wipe;\n']);
fprintf(materialTesterFid,['model testUniaxial;\n']);
fprintf(materialTesterFid,['set matTag ', num2str(matTag,'%u'), ';\n']);
fprintf(materialTesterFid,['set strainHistory {', strjoin(inputData), '};\n']);
fprintf(materialTesterFid,['set fileOut "hysteresis_matTag_$matTag.txt";\n']);
fprintf(materialTesterFid,['set out [open $fileOut w];\n']);
fprintf(materialTesterFid,[matDef '\n']);
fprintf(materialTesterFid,...
    ['uniaxialTest $matTag;\n',...
    'set strain 0.0;\n',...
    'set count 1;\n',...
    'set iTime 0;\n',...
    'set strain [expr $strain];\n',...
    'strainUniaxialTest $strain;\n',...
    'set stress [stressUniaxialTest];\n',...
    'set tangent [tangUniaxialTest];\n',...
    'set iTime [expr $iTime+1];\n',...
    'puts $out "$strain $stress";\n',...
    'foreach {strainExtremeVal} $strainHistory {\n',...
    '      set numIncr ' num2str(numIncr,'%u') ';\n',...
    '      set strainIncr [expr ($strainExtremeVal - $strain)/$numIncr];\n',...
    '      for {set i 0} {$i < $numIncr} {incr i 1} {\n',...
    '          set strain [expr $strain+$strainIncr];\n',...
    '          strainUniaxialTest $strain;\n',...
    '          set stress [stressUniaxialTest];\n',...
    '          set tangent [tangUniaxialTest];\n',...
    '          set iTime [expr $iTime+1];\n',...
    '          puts $out "$strain $stress";\n',...
    '      }\n',...
    '}\n',...
    'close $out;\n',...
    'puts "MATERIAL TESTER RAN SUCCESSFULLY!";\n',...
    'wipe;\n'...
    ]);
fclose(materialTesterFid);

```

```
58 [~, ~] = system(['"',localOpenSeesPath,'" "matTest.tcl"']);
59
60 fid = fopen(['hysteresis_matTag_' num2str(matTag,'%u') '.txt'],'r');
61 dataRead = textscan(fid, repmat('%f ',1,2), 'CollectOutput',true);
62 out = dataRead{1};
63 fclose(fid);
64 delete(['hysteresis_matTag_' num2str(matTag,'%u') '.txt']);
65 delete('matTest.tcl');
66
67 end
```