

# Using Functions in EES

- 1.) Functions must be defined at the top of the equations window. Comments or defined variables must be below ALL functions in the equations window.

```
Function PP(epsilon_32,epsilon_21,r,Cap_R)
  If (Cap_R<0) or (Cap_R>1) THEN
    PP = 0
  ELSE
    PP= (ln(epsilon_32/epsilon_21))/ln(r)
  ENDIF
END
{
Function RR(epsilon_21,r,P_RE,Cap_R)
  IF (Cap_R<0) or (Cap_R>1) THEN
    RR = 0
  ELSE
    RR=epsilon_21/((r^P_RE)-1)
  ENDIF
END
{
Function FS(P,FS_0,FS_1,FS_2)
  IF(P<=1) THEN
    FS = FS_1*P+FS_0*(1-P)
  ELSE
    FS = FS_1*P+FS_2*(P-1)
  ENDIF
END
{
```

{When using (IF THEN ELSE) or (IF OR THEN ELSE) or (IF AND THEN ELSE) Statement

*Figure 1: Example of defined functions at the top of the equations window.*

**NOTE: LOOK AT THE ATTACHED EES FILE TO SEE HOW FUNCTIONS WORK WITH LOOPS AND DEFINED VARIABLES!**

- 2.) The following command shows how functions work in EES. This statement says that function PP is a function of epsilon\_32, epsilon\_21, r, and Cap\_R. All variables within the changing equation (in this case equations PP) must be defined. IF OR THEN ELSE, IF AND THEN ELSE, and IF THEN ELSE are examples of commands that can be used in EES functions.

```
Function PP(epsilon_32,epsilon_21,r,Cap_R)
  If (Cap_R<0) or (Cap_R>1) THEN
    PP = 0
  ELSE
    PP = (ln(epsilon_32/epsilon_21))/ln(r)
  ENDIF
END
```

*Figure 2: Example of EES function and function syntax.*

- 3.) After a function is defined in the equations window, the function must be called to provide an answer. The following command uses function "PP" to write equation P\_RE within a duplicate loop. Notice that when function are used within a loop, each changing variable is defined using the loop's changing variable ("i" in this case).

```
P_RE[i] = PP(epsilon_32[i],epsilon_21[i],r,Cap_R[i])
```

*Figure 3: Example of equation calling previously defined function.*

- 4.) Functions are useful in situations where an equation or variable has to be "turned off" or "turned on" relative to time, error, etc.