Sample DOE-2.1 Code

Sample inputs in DOE-2.1 are shown below for two building configurations: clear wall and corner. Only the instructions that are modified to incorporate the equivalent wall results are included; the rest of the DOE-2.1 input is assumed unchanged.

To output a copy of the response factors, enter the command ‘ diagnostic errors’:

```
   *   5 * DIAGNOSTIC ERRORS ..
```

Sample 1: Wall Assembly 1 : 2x4 Wood Stud Clear Wall with R-11 Insulation

```
* 186 * MAT24-SW1 = MATERIAL
     * 187 *      TH    = 0.0625
     * 188 *      DENS  = 40
     * 189 *      S-H   = 0.25
     * 190 *      COND  = 0.10742
     * 191 *      ..
-INPUT - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
THICKNESS        =       0.0625 FT
-INPUT                                  -                                -
CONDUCTIVITY     =       0.1074 BTU/HR-FT-F
-INPUT                                  -                                -
DENSITY          =      40.0000 LB/CUFT
-INPUT                                  -                                -
SPECIFIC-HEAT    =       0.2500 BTU/LB-F
     * 192 *
     * 193 * MAT24-SW2 = MATERIAL
     * 194 *      TH    = 0.2708
     * 195 *      DENS  = 7.48
     * 196 *      S-H   = 0.25
     * 197 *      COND  = .0281
     * 198 *      ..
-INPUT - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
THICKNESS        =       0.2708 FT
-INPUT                                  -                                -
CONDUCTIVITY     =       0.0281 BTU/HR-FT-F
-INPUT                                  -                                -
DENSITY          =       7.4800 LB/CUFT
-INPUT                                  -                                -
SPECIFIC-HEAT    =       0.2500 BTU/LB-F
     * 199 *
     * 200 * MAT24-SW3 = MATERIAL
```

```
     * 201 *      TH    = 0.0833
     * 202 *      DENS  = 31.78
     * 203 *      S-H   = 0.25
     * 204 *      COND  = 0.0716
     * 205 *      ..
-INPUT - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
THICKNESS        =       0.0833 FT
-INPUT                                  -                                -
CONDUCTIVITY     =       0.0716 BTU/HR-FT-F
-INPUT                                  -                                -
DENSITY          =      31.7800 LB/CUFT
-INPUT                                  -                                -
SPECIFIC-HEAT    =       0.2500 BTU/LB-F
     * 206 *
     * 207 *
     * 208 * LAY24-SW = LAYERS
     * 209 *      INSIDE-FILM-RES = 0.68
     * 210 *      MAT= ( MAT24-SW1 , MAT24-SW2 , MAT24-SW3 )
     * 211 *      ..
-INPUT - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
INSIDE-FILM-RES  =       0.6800 HR-SQFT-F /BTU
-INPUT                                  -                                -
MATERIAL         = MAT24-SW1
-INPUT                                  -                                -
MATERIAL         = MAT24-SW2
-INPUT                                  -                                -
MATERIAL         = MAT24-SW3

            LAYER      THICKNESS         CONDUCTIVITY            DENSITY
SPECIFIC HEAT      RESISTANCE

               1          0.0625              0.1074            40.0000
0.2500           0.0000
               2          0.2708              0.0281             7.4800
0.2500           0.0000
               3          0.0833              0.0716            31.7800
0.2500           0.0000
               4          0.0000              0.0000             0.0000
0.0000           0.6800



                RESPONSE FACTORS CALCULATED BY LDL
         HOUR           X              Y              Z
           0      0.8009290695   0.0020447313   0.5302233696
```

```
            1     -0.6736914515   0.0271418635  -0.3145668507
            2     -0.0305244718   0.0297912192  -0.0837347209
            3     -0.0087082507   0.0143027985  -0.0301306695
            4     -0.0031356066   0.0058380640  -0.0115333600
            5     -0.0012004636   0.0023037924  -0.0044836490
            6     -0.0004667070   0.0009021168  -0.0017495293

                COMMON RATIO =     0.3906523883                U-VALUE =
0.0829032883


                 RESPONSE FACTORS CALCULATED BY LDL
         HOUR           X              Y              Z
            0      0.8009291291   0.0044716732   0.7362067103
            1     -0.6736018658   0.0412145071  -0.5788012743
            2     -0.0296413973   0.0295410100  -0.0524875335
            3     -0.0071770474   0.0091505442  -0.0124736782
            4     -0.0019308627   0.0025296258  -0.0033401723
            5     -0.0005252112   0.0006902678  -0.0009080328

                COMMON RATIO =     0.2724044025                U-VALUE =
0.0878561139

     * 212 *
     * 213 * CON24-SW = CONSTRUCTION
     * 214 *      ROUGHNESS   = 4
     * 215 *      ABSORPTANCE = 0.70
     * 216 *      LAYERS            = LAY24-SW
     * 217 *      ..
-INPUT - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
ABSORPTANCE      =       0.7000
-INPUT                                  -                                -
ROUGHNESS        =       4.0000
-INPUT                                  -                                -
LAYERS           = LAY24-SW
```

Sample 2: Wall Assembly 11: 2x4 Steel Stud Wall – Corner

```
186 * MAT24-SW1 = MATERIAL
     * 187 *      TH    = 0.0417
     * 188 *      DENS  = 40
     * 189 *      S-H   = 0.25
     * 190 *      COND  = 0.0567
     * 191 *      ..
-INPUT - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
THICKNESS        =       0.0417 FT
-INPUT                                -                                -
CONDUCTIVITY     =       0.0567 BTU/HR-FT-F
-INPUT                                -                                -
DENSITY          =      40.0000 LB/CUFT
-INPUT                                -                                -
SPECIFIC-HEAT    =       0.2500 BTU/LB-F
     * 192 *
     * 193 * MAT24-SW2 = MATERIAL
     * 194 *      TH    = 0.2917
     * 195 *      DENS  = 11.28
     * 196 *      S-H   = 0.25
     * 197 *      COND  = 0.0743
     * 198 *      ..
-INPUT - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
THICKNESS        =       0.2917 FT
-INPUT                                -                                -
CONDUCTIVITY     =       0.0743 BTU/HR-FT-F
-INPUT                                -                                -
DENSITY          =      11.2800 LB/CUFT
-INPUT                                -                                -
SPECIFIC-HEAT    =       0.2500 BTU/LB-F
     * 199 *
     * 200 * MAT24-SW3 = MATERIAL
     * 201 *      TH    = 0.0833
     * 202 *      DENS  = 39.482
     * 203 *      S-H   = 0.25
     * 204 *      COND  = 0.1337
     * 205 *      ..
-INPUT - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
THICKNESS        =       0.0833 FT
-INPUT                                -                                -
CONDUCTIVITY     =       0.1337 BTU/HR-FT-F
-INPUT                                -                                -
DENSITY          =      39.4820 LB/CUFT
-INPUT                                -                                -
```

```
SPECIFIC-HEAT    =       0.2500 BTU/LB-F
     * 206 *
     * 207 *
     * 208 * LAY24-SW = LAYERS
     * 209 *      INSIDE-FILM-RES = 0.68
     * 210 *      MAT= ( MAT24-SW1 , MAT24-SW2 , MAT24-SW3 )
     * 211 *      ..
-INPUT - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
INSIDE-FILM-RES  =       0.6800 HR-SQFT-F /BTU
-INPUT                                -                                -
MATERIAL         = MAT24-SW1
-INPUT                                -                                -
MATERIAL         = MAT24-SW2
-INPUT                                -                                -
MATERIAL         = MAT24-SW3

            LAYER      THICKNESS         CONDUCTIVITY            DENSITY
SPECIFIC HEAT      RESISTANCE

               1          0.0417              0.0567            40.0000
0.2500           0.0000
               2          0.2917              0.0743            11.2800
0.2500           0.0000
               3          0.0833              0.1337            39.4820
0.2500           0.0000
               4          0.0000              0.0000             0.0000
0.0000           0.6800



                RESPONSE FACTORS CALCULATED BY LDL
         HOUR           X              Y              Z
           0      0.7274243832   0.0091660954   0.6762448549
           1     -0.4907808900   0.0676889643  -0.3456013501
           2     -0.0451141372   0.0533047579  -0.1012116596
           3     -0.0147568397   0.0227844398  -0.0378385372
           4     -0.0055780984   0.0089837071  -0.0146291647
           5     -0.0021603284   0.0035016935  -0.0056853900

               COMMON RATIO =     0.3889942467                U-VALUE =
0.1676597148


                RESPONSE FACTORS CALCULATED BY LDL
         HOUR           X              Y              Z
```

```
            0      0.7274315953   0.0237269122   1.0781788826
            1     -0.4892742336   0.1084623337  -0.8136870265
            2     -0.0385886952   0.0443799384  -0.0596441068
            3     -0.0081076408   0.0099292109  -0.0122521874
            4     -0.0017466235   0.0021455160  -0.0026364697

                COMMON RATIO =     0.2157029510                U-VALUE =
0.1892340332

     * 212 *
     * 213 * CON24-SW = CONSTRUCTION
     * 214 *      ROUGHNESS   = 4
     * 215 *      ABSORPTANCE = 0.70
     * 216 *      LAYERS            = LAY24-SW
     * 217 *      ..
-INPUT - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
ABSORPTANCE      =       0.7000
-INPUT                                  -                               -
ROUGHNESS        =       4.0000
-INPUT                                  -                               -
LAYERS           = LAY24-SW
```

....

```
317 * EXTERIOR-WALL
     * 318 *      HEIGHT       = 8.00
     * 319 *      WIDTH        = 2.00
     * 320 *      CONSTRUCTION = CON24-SW
     * 321 *      TILT         = 90
     * 322 *      AZIMUTH      = 270
```

Response factors calculated by DOE-2.1 are of two kinds. The first set corresponds to the wall with inside surface film resistance, the second set to the wall without surface film resistance. Notice that the second set of response factors is the same as equivalent wall response factors (Part II: Tables 1.8 and 11.8) and the common ratio is the same (Part II: Table 1.7: $\alpha = 0.272$, Table 11.7 $\alpha = 0.215$). Negligible differences between equivalent wall response factors and those calculated by DOE-2, are due to the fact that the equivalent wall approach uses exact values of resistances and capacitances of subsequent layers whereas DOE-2.1 calculates them