

```
CLEAR REVERT=NO
$string yesorno YES
```

```
VARIABLE OPTION=PARAMETER, NAME=#L1_thickness, VALUE=.2, DESCRIPTION='thickness of the
Layer 1'
VARIABLE OPTION=PARAMETER, NAME=#L2_thickness, VALUE=.3, DESCRIPTION='thickness of the
Layer 2'
VARIABLE OPTION=PARAMETER, NAME=#L3_thickness, VALUE=.3, DESCRIPTION='thickness of the
Layer 3'
VARIABLE OPTION=PARAMETER, NAME=#L4_thickness, VALUE=.4, DESCRIPTION='thickness of the
Layer 4'
```

```
VARIABLE OPTION=PARAMETER, NAME=#L1_size, VALUE=120, DESCRIPTION='half size of the Layer
1'
VARIABLE OPTION=PARAMETER, NAME=#L2_size, VALUE=130, DESCRIPTION='half size of the Layer
2'
VARIABLE OPTION=PARAMETER, NAME=#L3_size, VALUE=150, DESCRIPTION='half size of the Layer
3'
VARIABLE OPTION=PARAMETER, NAME=#L4_size, VALUE=175, DESCRIPTION='half size of the Layer
4'
```

```
VARIABLE OPTION=PARAMETER, NAME=#D2 VALUE=#L4_size+#L4_thickness
VARIABLE OPTION=PARAMETER, NAME=#D1 VALUE=#L4_size
```

Thought of using 'reduced potential' option?

```
BLOCK Name='L4_Out' X0=-#D2 Y0=-#D2 Z0=-#D2 X1=#D2 Y1=#D2 Z1=#D2 MATERIALLABEL='mumetal'
BLOCK Name='L4_In' X0=-#D1 Y0=-#D1 Z0=-#D1 X1=#D1 Y1=#D1 Z1=#D1
PICK OPTION=TOGGLE, | PICK PROPERTY=Name LABEL=L4_Out
PICK OPTION=TOGGLE, | PICK PROPERTY=Name LABEL=L4_In
COMBINE OPERATION=SUBTRACT +REGULAR
```

```
VARIABLE OPTION=PARAMETER, NAME=#D2 VALUE=#L3_size+#L3_thickness
VARIABLE OPTION=PARAMETER, NAME=#D1 VALUE=#L3_size
```

```
BLOCK Name='L3_Out' X0=-#D2 Y0=-#D2 Z0=-#D2 X1=#D2 Y1=#D2 Z1=#D2 MATERIALLABEL='mumetal'
BLOCK Name='L3_In' X0=-#D1 Y0=-#D1 Z0=-#D1 X1=#D1 Y1=#D1 Z1=#D1
PICK OPTION=TOGGLE, | PICK PROPERTY=Name LABEL=L3_Out
PICK OPTION=TOGGLE, | PICK PROPERTY=Name LABEL=L3_In
COMBINE OPERATION=SUBTRACT +REGULAR
```

```
VARIABLE OPTION=PARAMETER, NAME=#D2 VALUE=#L2_size+#L2_thickness
VARIABLE OPTION=PARAMETER, NAME=#D1 VALUE=#L2_size
```

```
BLOCK Name='L2_Out' X0=-#D2 Y0=-#D2 Z0=-#D2 X1=#D2 Y1=#D2 Z1=#D2 MATERIALLABEL='mumetal'
BLOCK Name='L2_In' X0=-#D1 Y0=-#D1 Z0=-#D1 X1=#D1 Y1=#D1 Z1=#D1
PICK OPTION=TOGGLE, | PICK PROPERTY=Name LABEL=L2_Out
PICK OPTION=TOGGLE, | PICK PROPERTY=Name LABEL=L2_In
COMBINE OPERATION=SUBTRACT +REGULAR
```

```
VARIABLE OPTION=PARAMETER, NAME=#D2 VALUE=#L1_size+#L1_thickness
VARIABLE OPTION=PARAMETER, NAME=#D1 VALUE=#L1_size
```

```
BLOCK Name='L1_Out' X0=-#D2 Y0=-#D2 Z0=-#D2 X1=#D2 Y1=#D2 Z1=#D2 MATERIALLABEL='mumetal'
BLOCK Name='L1_In' X0=-#D1 Y0=-#D1 Z0=-#D1 X1=#D1 Y1=#D1 Z1=#D1
PICK OPTION=TOGGLE, | PICK PROPERTY=Name LABEL=L1_Out
PICK OPTION=TOGGLE, | PICK PROPERTY=Name LABEL=L1_In
COMBINE OPERATION=SUBTRACT +REGULAR
```

```
BLOCK Name='Inside' X0=-#D1 Y0=-#D1 Z0=-#D1 X1=#D1 Y1=#D1 Z1=#D1 MATERIALLABEL=Inside
```

```

UNIQUENAME=Inside
PICK OPTION=TOGGLE, | PICK PROPERTY=Name LABEL=Inside
CELldata OPTION=MODIFY MATERIALLABEL='Inside' POTENTIAL=Total ELEMENTTYPE=Linear LEVEL=3
ELEMShapePref=NONE

```

Here, does the order of these four lines matter?

```

PICK OPTION=TOGGLE, | PICK PROPERTY=Name LABEL=L4_Out
PICK OPTION=TOGGLE, | PICK PROPERTY=Name LABEL=L3_Out
PICK OPTION=TOGGLE, | PICK PROPERTY=Name LABEL=L2_Out
PICK OPTION=TOGGLE, | PICK PROPERTY=Name LABEL=L1_Out

```

```

CELldata OPTION=MODIFY MATERIALLABEL='mumetal' POTENTIAL=Total ELEMENTTYPE=Linear
LEVEL=3 ELEMShapePref=NONE

```

BACKGROUND OPTION=LOAD Why is this necessary? will it be overwritten by the boundary definition in the last part of the file?

```

BACKGROUND SCALER=10 EMRZX=TANGMAGN EMRYZ=TANGMAGN EMROTZTYPE=Positive
THERMALRXY=Insulator THERMALRYZ=Insulator THERMALRZX=Insulator THERMALROTZTYPE=Positive
STRESSRXY=NormFixed STRESSRYZ=NormFixed STRESSRZX=NormFixed STRESSROTZTYPE=Positive
BCRIGHT=Default BCLEFT=Default BCTOP=Default BCBOTTOM=Default BCFRONT=Default
BCBACK=Default BCRADIUS=Default REFLECTION=None OPTION=SET SHAPE=BLOCK SCALEX=5 SCALEY=5
SCALEZ=5 XSYMMETRYPLANE=NO ZSYMMETRYPLANE=NO ROTZNUM=1 ZXSMMETRYPLANE=NO

```

```

MODEL CREATE

```

```

PICK WAIT=NO WILDCARD=NO OPTION=TOGGLE TYPE=CELL UNIQUEBODYNAME=ModelBody IDENTIFIER=BB.
00001

```

```

PICK WAIT=NO WILDCARD=NO OPTION=ADD TYPE=CELL UNIQUEBODYNAME=ModelBody IDENTIFIER=BB.
00001

```

```

CELldata OPTION=MODIFY MATERIALLABEL=Air POTENTIAL=Reduced ELEMENTTYPE=Linear
ELEMShapePref=NONE

```

```

PICK OPTION=TOGGLE, | PICK PROPERTY=Name LABEL=Inside
CELldata OPTION=MODIFY MATERIALLABEL='Inside' POTENTIAL=Total ELEMENTTYPE=Linear LEVEL=3
ELEMShapePref=NONE

```

```

/MATERIALS UNPICK | MATERIALS GUIINIT
/MATERIALS PICK 'mumetal'
/MATERIALS OPTION=MODIFY MLINEARITY=LINEAR MUANISOTROPY=ISOTROPIC MU=2000000 HC=0.0 |
MATERIALS UNPICK

```

```

/BHDATA OPTION=LOAD LABEL=mu_custom FILE=/home/sher/ucn/opera/msr/
mumetal_bh_latest_feb.bh
/MATERIALS PICK 'mumetal'
/MATERIALS OPTION=MODIFY MLINEARITY=NONLINEAR MUANISOTROPY=ISOTROPIC BH='mu_custom'

```

```

/BHDATA OPTION=LOAD LABEL=mumetal FILE=/home/sher/Opera_18R2/code/bh/permag49.bh
/MATERIALS PICK 'mumetal'
/MATERIALS OPTION=MODIFY MLINEARITY=NONLINEAR MUANISOTROPY=ISOTROPIC BH='mumetal'

```

```

PICK OPTION=TOGGLE, | PICK PROPERTY=MaterialLabel LABEL=mumetal
CELldata OPTION=MODIFY MATERIALLABEL='mumetal' POTENTIAL=Total ELEMENTTYPE=Linear
LEVEL=3 SIZE=3 ELEMShapePref=NONE

```

```

/PICK OPTION=TOGGLE, | PICK PROPERTY=MaterialLabel LABEL=Inside
/CELldata OPTION=MODIFY MATERIALLABEL='Inside' POTENTIAL=Total ELEMENTTYPE=Linear
LEVEL=3 SIZE=5 ELEMShapePref=NONE

```

Not sure what these lines are doing. What is the difference between OPTION=TOGGLE and ADD, and what is teh IDENTIFIER =0.000001 etc.?

```
BOUNDARY OPTION=UNPICK
PICK WAIT=NO WILDCARD=NO OPTION=TOGGLE TYPE=CELL UNIQUEBODYNAME=ModelBody IDENTIFIER=U.
00001
PICK WAIT=NO WILDCARD=NO OPTION=TOGGLE TYPE=CELL UNIQUEBODYNAME=ModelBody IDENTIFIER=U.
00002
PICK WAIT=NO WILDCARD=NO OPTION=TOGGLE TYPE=CELL UNIQUEBODYNAME=ModelBody IDENTIFIER=U.
00003
PICK WAIT=NO WILDCARD=NO OPTION=ADD TYPE=CELL UNIQUEBODYNAME=ModelBody IDENTIFIER=U.
00003
CELLDATA OPTION=MODIFY MATERIALLABEL=Air POTENTIAL=Total ELEMENTTYPE=Linear LEVEL=3
SIZE=3 ELEMSHAPEPREF=NONE
PICK WAIT=NO WILDCARD=NO OPTION=TOGGLE TYPE=CELL UNIQUEBODYNAME=ModelBody IDENTIFIER=A.
00001
PICK WAIT=NO WILDCARD=NO OPTION=ADD TYPE=CELL UNIQUEBODYNAME=ModelBody IDENTIFIER=A.
00001
CELLDATA OPTION=MODIFY MATERIALLABEL=Inside POTENTIAL=Total ELEMENTTYPE=Linear LEVEL=3
SIZE=3 ELEMSHAPEPREF=NONE
MATERIALS OPTION=GUIINIT Is it necessary?
MATERIALS OPTION=PICK MATERIALLABEL=mumetal
MATERIALS MPHASE=0 MUXX=1.0 MUYY=1.0 MUZZ=1.0 HCX=0.0 HCY=0.0 Hcz=0.0 MAPHASE=0
SIGANISOTROPY=ISOTROPIC SIGMA=0.0 SPHASE=0 SIGXX=0.0 SIGYY=0.0 SIGZZ=0.0 SAPHASE=0
EPSANISOTROPY=ISOTROPIC EPSILON=1.0 EPHASE=0 EPSXX=1.0 EPSYY=1.0 EPSZZ=1.0 EAPHASE=0
KAPANISOTROPY=ISOTROPIC BASENAME=mumetal IW=MUMETAL_I JOULEHEAT=YES USESIBC=No
MECHANICALANISOTROPY=Isotropic THERMALEXPANSION=0 GENERALEXPANSION=0 THERMALEXPANSIONX=0
THERMALEXPANSIONY=0 THERMALEXPANSIONZ=0 GENERALEXPANSIONX=0 GENERALEXPANSIONY=0
GENERALEXPANSIONZ=0 OPTION=MODIFY MULINEARITY=LINEAR MUANISOTROPY=ISOTROPIC MU=20000
HC=0.0
MATERIALS OPTION=UNPICK
```

```
ANALYSISDATA OPTION=ACTIVATE PROGRAM=TOSCAMAGN | ANALYSISDATA OPTION=LOAD
PROGRAM=TOSCAMAGN | DBCASEDATA OPTION=LOAD PROGRAM=TOSCAMAGN
ANALYSISDATA OPTION=SET PROGRAM=TOSCAMAGN LINEAR=YES CONVTOL=1.0E-08 HX=0 HY=0 HZ=3.5
SCALEDRIIVE='ALL' RHS=ADAPTIVE POTENTIALCUT=YES USEDEFORMEDMESH=NO
```

This defines the magnetic boundary conditions using a different command from the ealrier one 'BACKGROUND'

```
MESH GENERATOR=AUTOMATIC SIZE=15 NORMALTOL=30.0 SURFACETOL=0.0 TOLERANCE=1.0E-06
TYPE=PREFERTETRA
```

Where does it define how much should be the void space exterior to the model ?

```
FILL TOL=1.0E-06
```

```
/imposing boundary condition for a Z-directed field.
```

What are these lines for?

```
BOUNDARY PICK 'Farfield Back (-z)'
BOUNDARY OPTION=MODIFY CONDITION=NORMMAGN | BOUNDARY UNPICK
BOUNDARY PICK 'Farfield Front (+z)'
BOUNDARY OPTION=MODIFY CONDITION=NORMMAGN | BOUNDARY UNPICK
```