

Instructions of *AutoWinding.m*

Function:

- Auto winding arrangement calculation. The slot-star vectogram will be plotted. The slot-phase arrangements and corresponding data will be displayed in the command window.
- Auto excitation arrangement in ANSYS Maxwell 2D/3D. No need for manual input.

How to use it:

1. Fill the "input" according to your model (Fig. 1). The items you need to fill are:
 - a) Mode of this program (*mode*). The five modes of this program are:
 - i. Mode 1 for single layer auto winding excitation arrangement in Maxwell 2D.
 - ii. Mode 2 for double layer auto winding excitation arrangement in Maxwell 2D.
 - iii. Mode 3 for single layer auto winding excitation arrangement in Maxwell 3D.
 - iv. Mode 4 for double layer auto winding excitation arrangement in Maxwell 3D.
 - v. Mode 5 for winding arrangement display only.
 - b) Output filename of the .vbs (*OutputFilename*).
 - c) Project name of your .aedt file (*ProjectName*).
 - d) Design name in your project (*DesignName*).
 - e) Terminal name of your first layer coil (*TerminalName1*).
 - f) Terminal name of your second layer coil for mode 2 and 4 (*TerminalName2*).
 - g) Phase number of the machine (*m*).
 - h) Pole-pair number of the machine (*p*).
 - i) Slot number of the machine (*z*).
 - j) Coil pitch of the machine (*coil_pitch*). 0 for auto coil pitch calculation. [1, +inf) for manual control.
 - k) Number of one layer conductors (*N*).

```
% Input
mode=3;
% mode=1 for single layer auto winding excitation arrangement in Maxwell 2D
% mode=2 for double layer auto winding excitation arrangement in Maxwell 2D
% mode=3 for single layer auto winding excitation arrangement in Maxwell 3D
% mode=4 for double layer auto winding excitation arrangement in Maxwell 3D
% mode=5 for winding arrangement display only
OutputFilename='test1.vbs';    % Filename of .vbs
ProjectName='MG2-3D';          % Filename of .aedt
DesignName='noload';           % Name of the design
TerminalName1='Coil';          % Name of the winding terminal
TerminalName2='Coilu';         % Name of the winding terminal (For mode 2 and mode 4)
m=3;                            % Phase
p=2;                            % Pole pairs
z=12;                           % Slots
coil_pitch=3;                   % 0 for auto coil pitch calculation, [1, +inf) for manual control
N=4;                            % Number of one layer conductors
```

Fig. 1

2. Run the .m file. The slotA.vbs will generate in the same folder of .m file (Fig. 2). The slot-star vectogram will be plotted (Fig. 3) and the slot-phase arrangements will be displayed in the command window (Fig. 4). **Close the MATLAB after you have finished this step.**

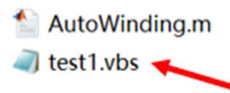


Fig. 2

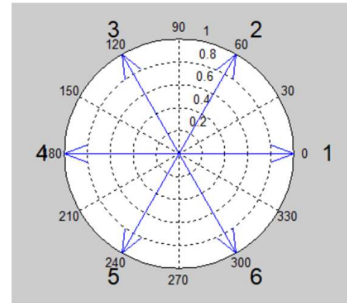


Fig. 3

```

Coil pitch = 2 slot(s)
Slot angle = 60.0000 deg
Pitch factor = 0.8660
Distribution factor = 1.0000
Winding factor = 0.8660
+++++
-C +B -A +C -B +A -C +B -A +C -B +A -C +B -A +C -B +A
+A -C +B -A +C -B +A -C +B -A +C -B +A -C +B -A +C -B
f> >>

```

Fig. 4

- Open the *.aedt* file. **Make sure there are no items in “Excitations” (Fig. 5). Also make sure that there should be no variable named as "N" in your Maxwell 2D/3D > Design properties.**

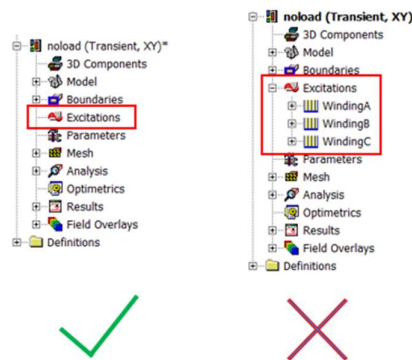


Fig. 5

- Run the script in “Tools > Run script” (Fig. 6). The excitation will automatically be arranged.

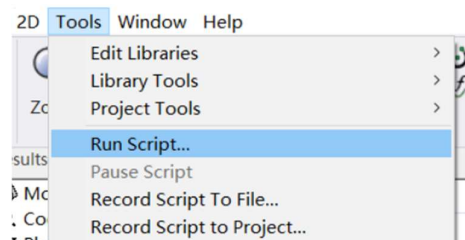


Fig. 6