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.

```
% Input
mode=2;
% 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='MG1-2D';        % 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=4;       % Pole pairs
z=24;       % Slots
coil_pitch=0;       % 0 for auto coil pitch calculation, [1, +inf) for manual control
```

Fig. 1

2. Run the *.m* file. The *.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.**

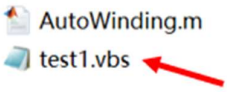

Fig. 2

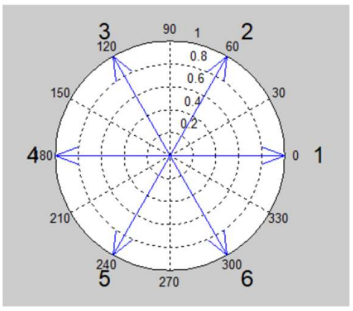

Fig. 3

```
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 -C +B -A +C -B +A
+A -C +B -A +C -B +A -C +B -A +C -B +A -C +B -A +C -B +A -C +B -A +C -B
fx >>
```

Fig. 4

3. Open the *.aedt* file. **Make sure there are no items in "Excitations"** (Fig. 5)**.**

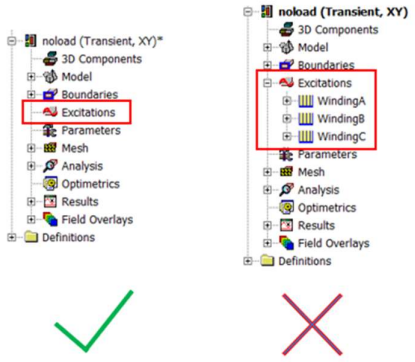

Fig. 5

4. Run the script in "Tools > Run script" (Fig. 6). The excitation will automatically be arranged.

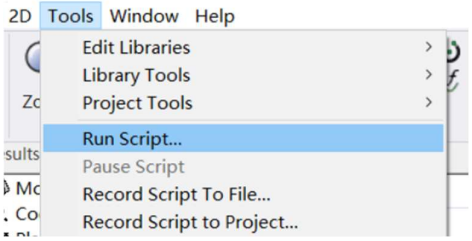

Fig. 6