

Animation Of Parametric Analysis Results

Parametric analysis of a design allows you to view analysis results for different scenarios involving the model. For example in last months newsletter, we studied the effects of changing the distance between two oppositely charged high voltage cables. We generated results for each step and were able to examine these results. The downside to this is that the images are displayed static for a dynamic analysis.

What if we could display the results with respect to time?

Animation displays an image of the results with respect to time. In the following example, we will analyze and display the results for the field lines generated by a motor. The parametric steps allow us to study the field lines at various positions of the rotor.

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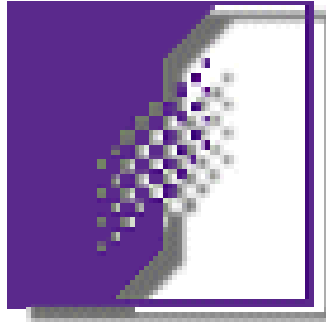
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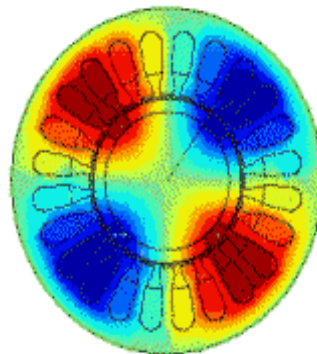
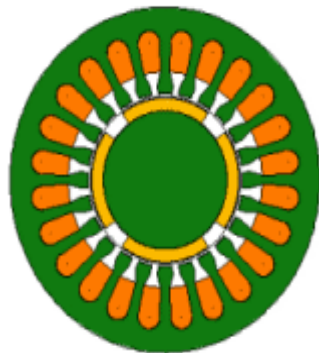
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Animation Of Parametric Analysis Results



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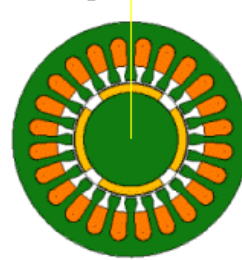
What if we could display the results with respect to time?

Animation displays an image of the results with respect to time. In the following example, we will analyze and display the results for the field lines generated by a motor. The parametric steps allow us to study the field lines at various positions of the rotor.

To create an animation:

1. Create the parametric analysis in the IES program.
2. Create the images for the animation.
3. Insert the images into an animation program.
4. Optimize and Save the animation.
5. Display.

Rotate rotor geometry
36 steps @ 10° per step
total rotation = 360°



The Parametric analysis:

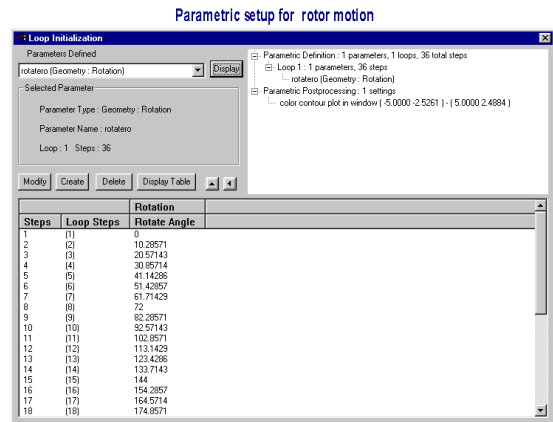
1. Setup and define a parametric analysis using the advanced parametrics functions of Integrated's 2D software.

In this case, we are dealing with a 2D magnetostatic analysis, so we are using MAGNETO.

The rotor of the motor is to be rotated one complete revolution in 36 steps of 10°.

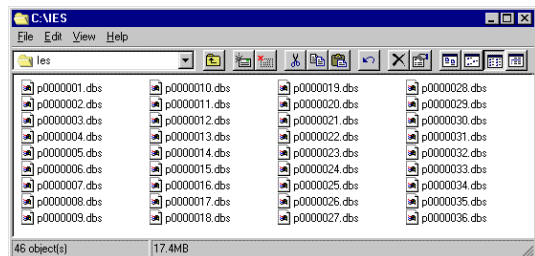
The parametric loop structure is shown at right.

2. Run the parametric analysis to produce 36 database files containing the analysis results.

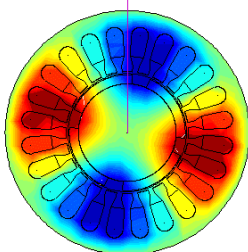


The completed databases are shown at right.

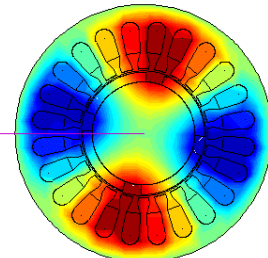
3. Open file p0000001.dbs and view the results.
4. Open files p0000009, and 18.
5. Notice the change in the fields as the rotor is moved.



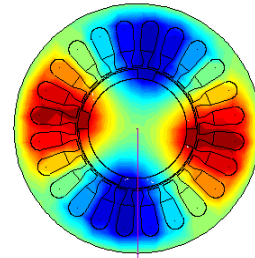
Field Plot for Rotor Position 1



Field Plot for Rotor Position 9

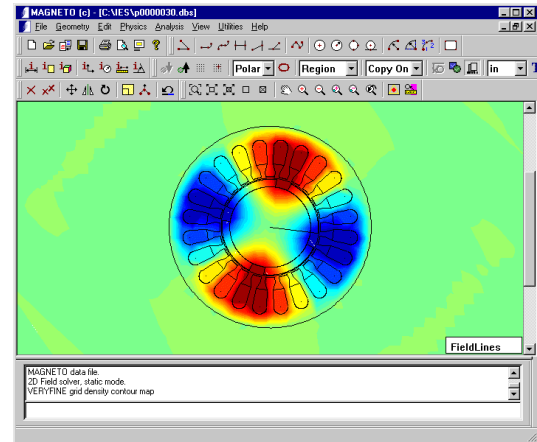


Field Plot for Rotor Position 18

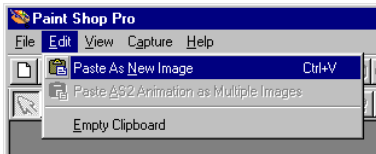


To create the graphics for the animation:

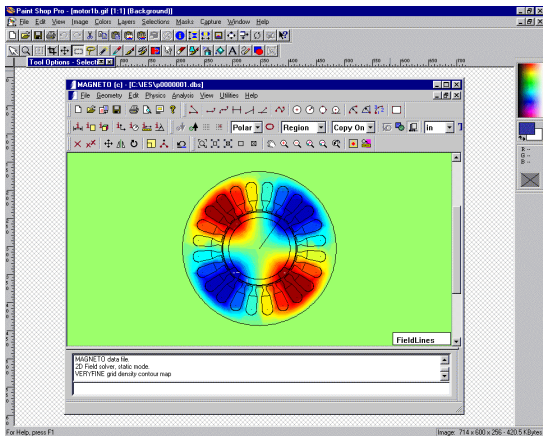
1. Close all of the databases except p0000001.
2. Place the cursor on the program title bar, and press and hold the left mouse button.
3. With the left mouse button still depressed, press <Ctrl + Print Screen>.
4. This will capture the image of parametric step 1.
5. Open a graphics program (I use JASC Paint Shop Pro 6 because it handles the graphics well and comes with a great companion animation program)



6. Select Edit >Paste as New Image

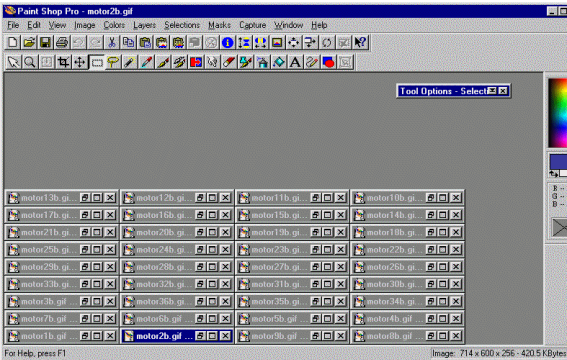


7. The screen should be similar to the one at right.
8. Save this image as "motor1.gif" and then close that file.
9. Return to MAGNETO and open p0000002 database.
10. Repeat steps 2 to 8 for each parametric result, and save them individually as motor2.gif, motor3.gif etc. for all the files 2 to 36.



You will end up with 36 files, each one representing one step of the parametric analysis.

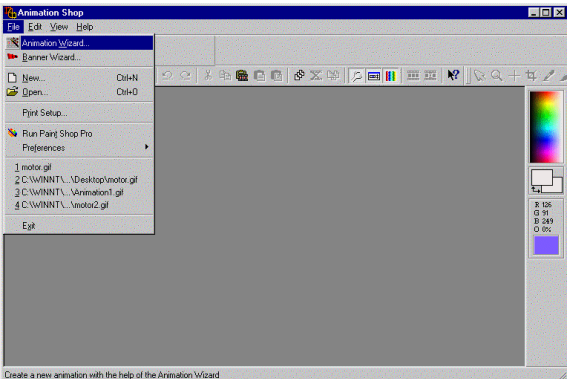
This completes the creation of the graphics for the animation.



To Create the animation:

1. Open your animation program and import the graphics.
2. In our example, we are using JASC Animation Shop 2.
3. Select File >Animation Wizard

This starts a relatively easy and seamless graphic importer and applies basic animation properties.



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The first step in the creation is to define the size of the animation frame. You can enter in a size that you have predetermined, or select "Same size as the first image".

All of our graphics are the same size, (provided that you haven't made any changes to the IES program window or any of the graphics themselves)

1. Select "Same size as the first image".

This will make the importing easier and we can adjust the images after they are imported.

2. Select "Next".

The next screens set the transparency of the animation. We are not concerned in this case with transparency.

3. Select Opaque then Next.
4. Select "Centered in the Frame" and fill empty spaces with the canvas color, then Next

For the sake of smoothness, we want the animation to run continuously.

5. Select "yes repeat the animation indefinitely."
6. Select Next.

The Wizard is now ready to start importing the graphics you created earlier.

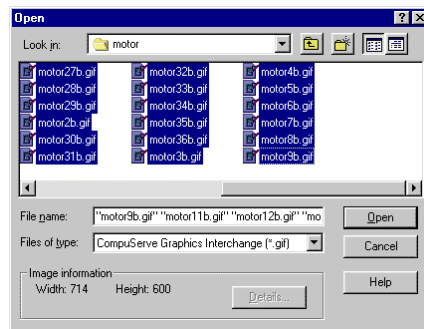
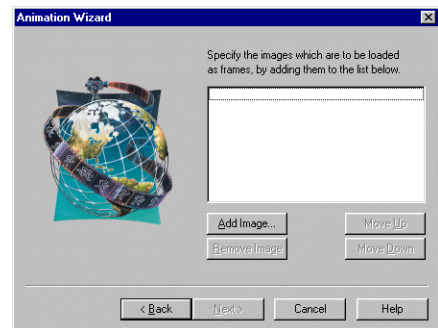
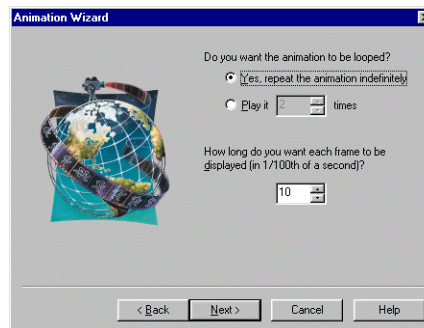
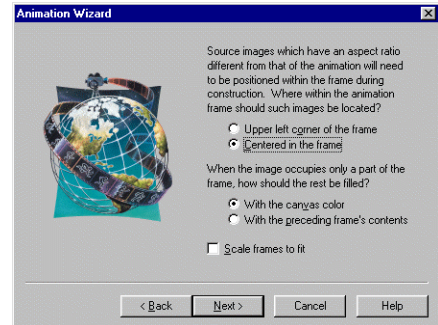
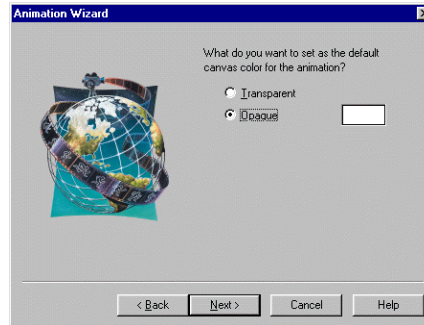
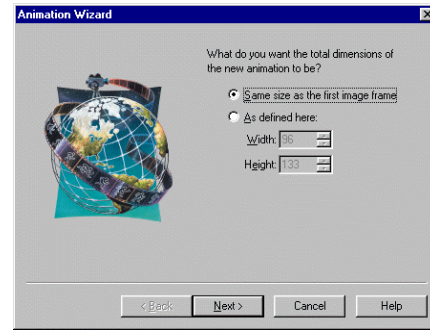
7. Select "Add Image".

This opens a Windows standard file selection dialog box.

8. Select all of the graphics you want to include and press Open.
9. Using the Move Up, Move Down buttons, place the graphics in their correct numerical order, then select Next.

The animation Wizard is now ready to create the animation,

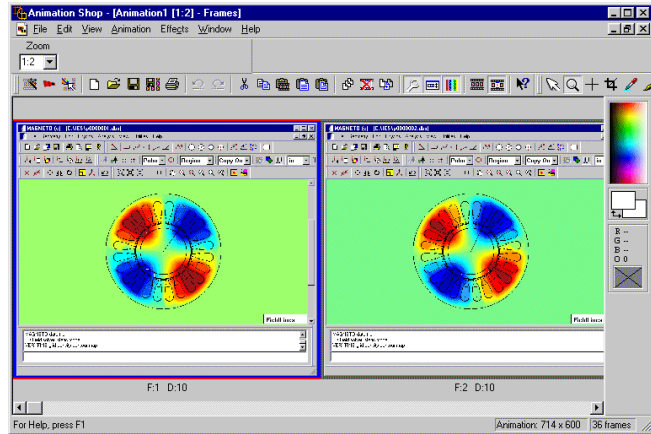
10. Select Finish



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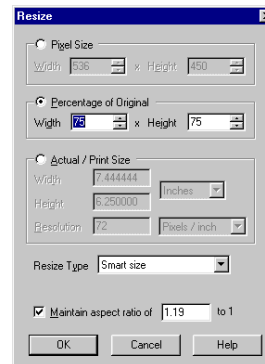
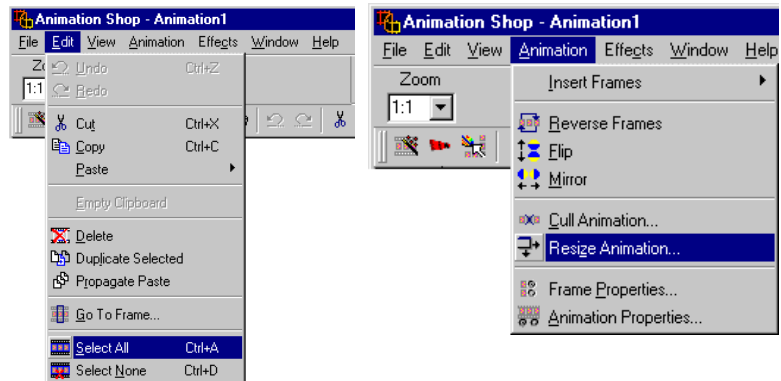
When the program has completed importing the graphics, your screen should look similar to the one at right. Each frame is shown in a sequential timeline and information about each frame is displayed below.

The animation as it stands, includes the IES program interface in the frame, causing a rather large graphic and animation.




To Resize the animation:

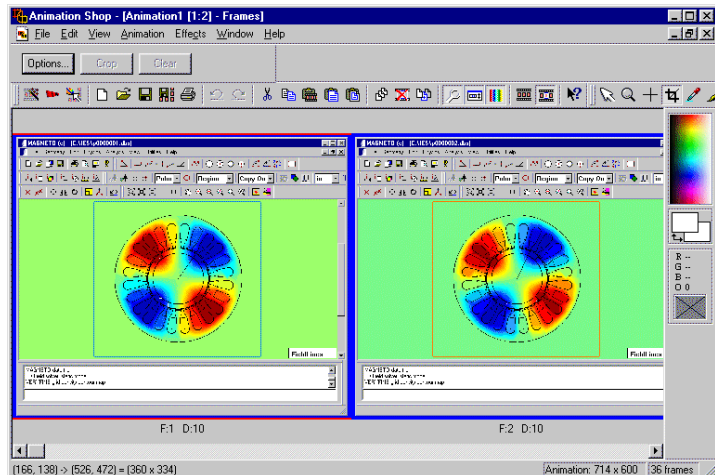
1. Select File >Select All. This makes all the frames active at the same time.
2. Select Animation >Resize Animation. This brings up the Resize Dialog box.
3. Set the dialog box to resize the animation to 75% of its original size.
4. Click Ok.



This now reduces the size of each animation frame to 75% of original. Now that the entire animation is resized, we can crop out all of the information in the frame that we don't need.

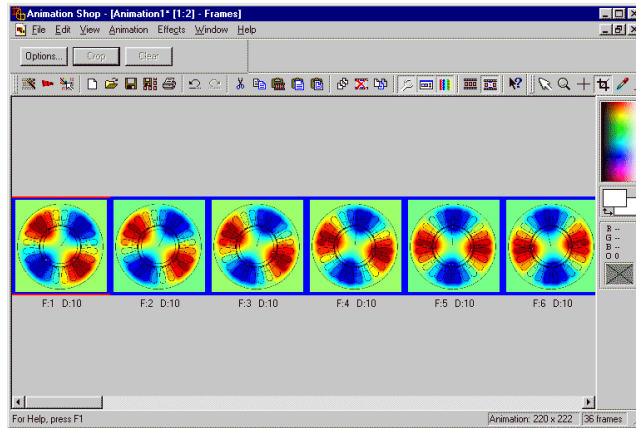
To Crop the Graphics:

1. Select Edit >Select All,
2. Select the cropping tool. 
3. Drag a rectangular or square shape around the motor in the first frame.
4. Notice that this also draws an identical shape in the remaining frames.
5. Press Crop in the upper toolbar.



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The animation is cropped and should look like the one at right.



Optimizing and Saving the Animation:

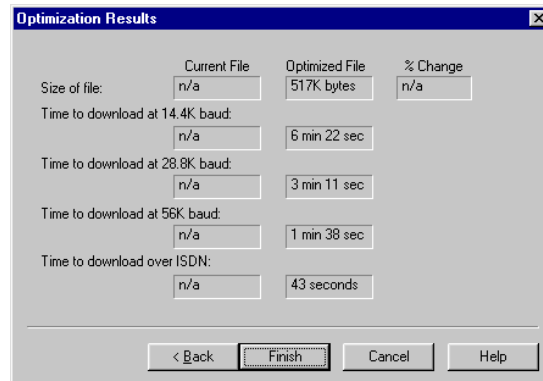
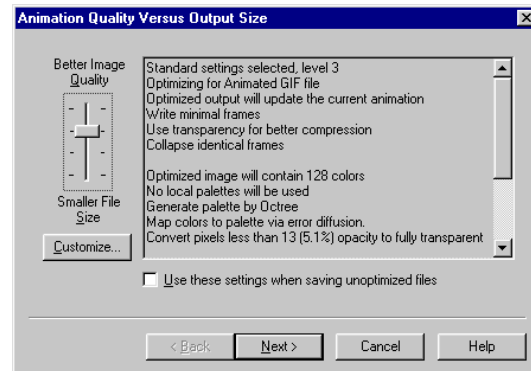
1. Select File > Save.

A standard Windows style save file dialogue box appears.


2. Enter the name of your animation and press Save.

The Quality vs. Output box appears and allows you to choose the type of colors and resolution you would like to have your animation saved as.

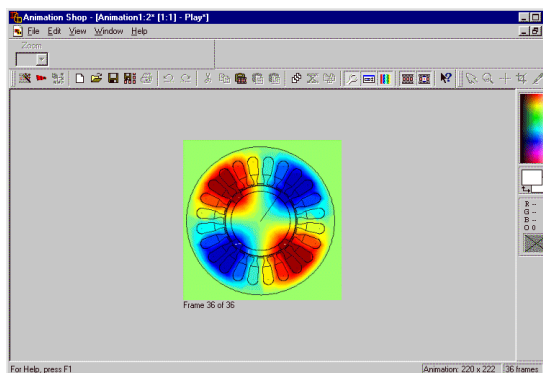
3. Press Next, and the program will go through the optimization process.
4. When the Optimized Results dialog box appears, showing you the file size and approximate download times. You have the option of accepting or re-optimizing the animation.
5. Select Finish.



The completed animation should appear as shown at right.

Press the Play Animation button  and view your results.

Your animation is now ready to be inserted into your application, or viewed by using your browser.



Please keep in mind that these are the very basics of creating an animation from your parametric results. The only limit now is your imagination.