Ngày 5 tháng 6 năm 2023

Buổi sáng

Buổi chiều

Ngày 6 tháng 6 năm 2023

Buổi sáng

Làm mô phỏng quạt ốc sên (lỗi)

Buổi chiều

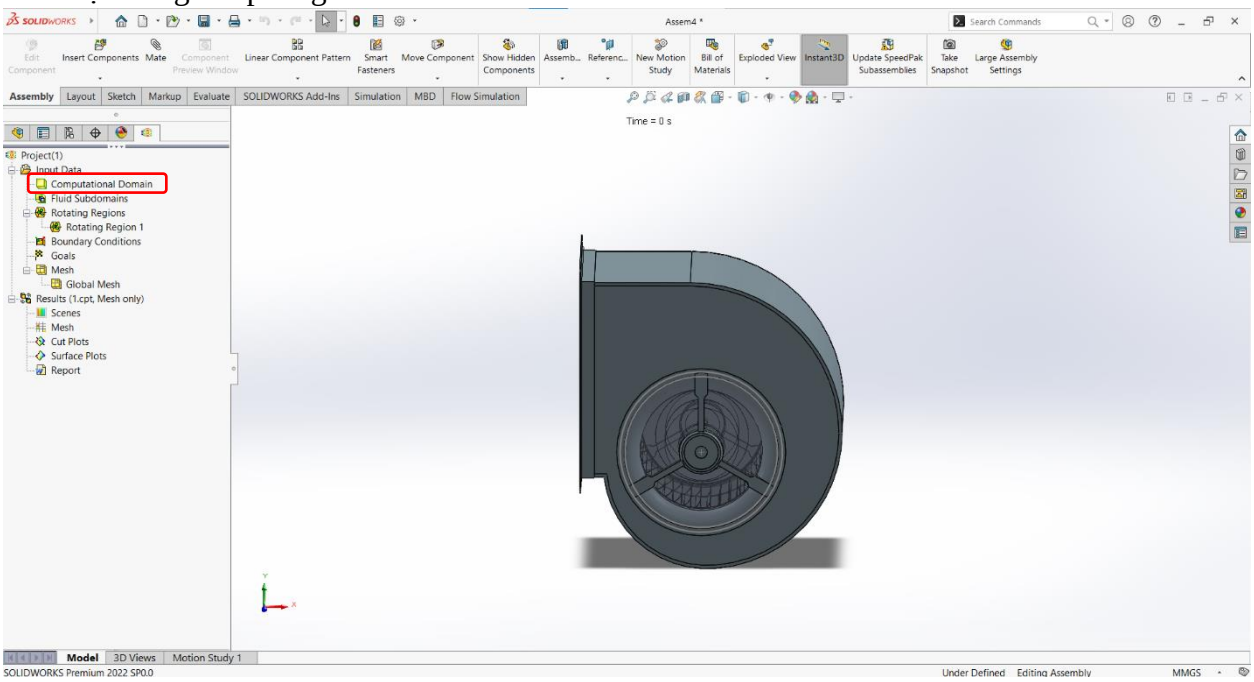
Làm mô phỏng quạt ốc sên (lỗi)

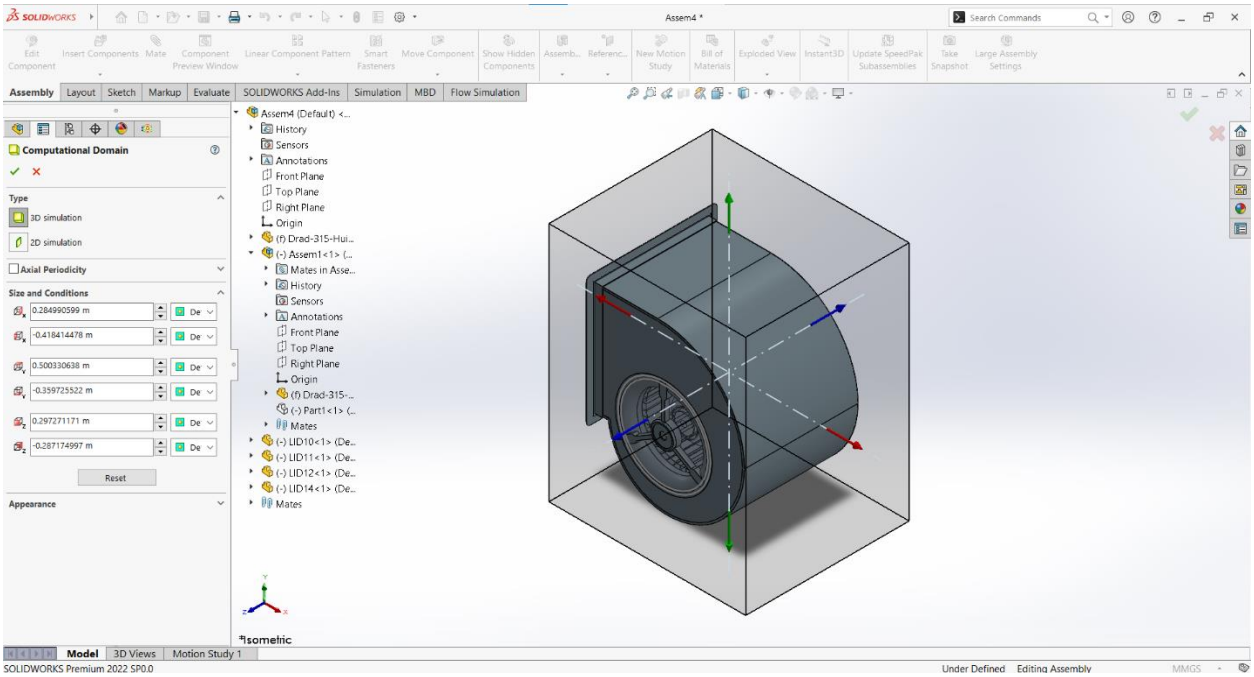
Ngày 7 tháng 6 năm 2023

Buổi sáng

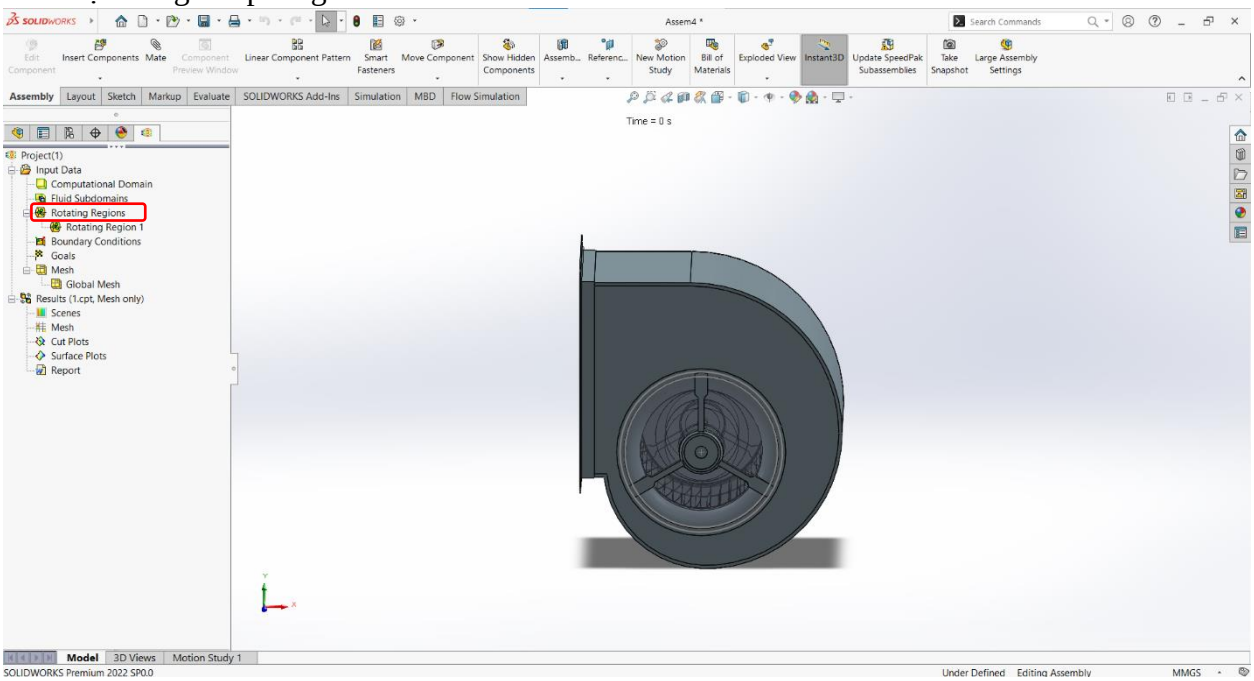
Làm mô phỏng quạt ốc sên (Hoàn thành)

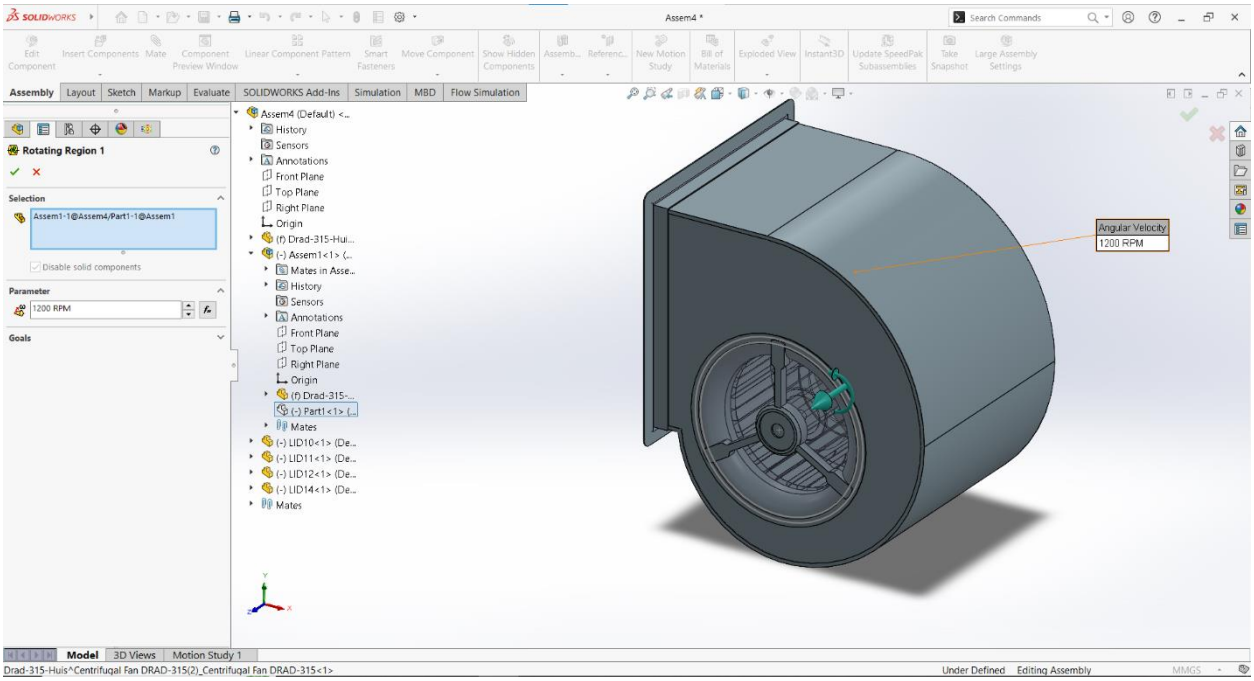
B1 Chọn vùng mô phỏng



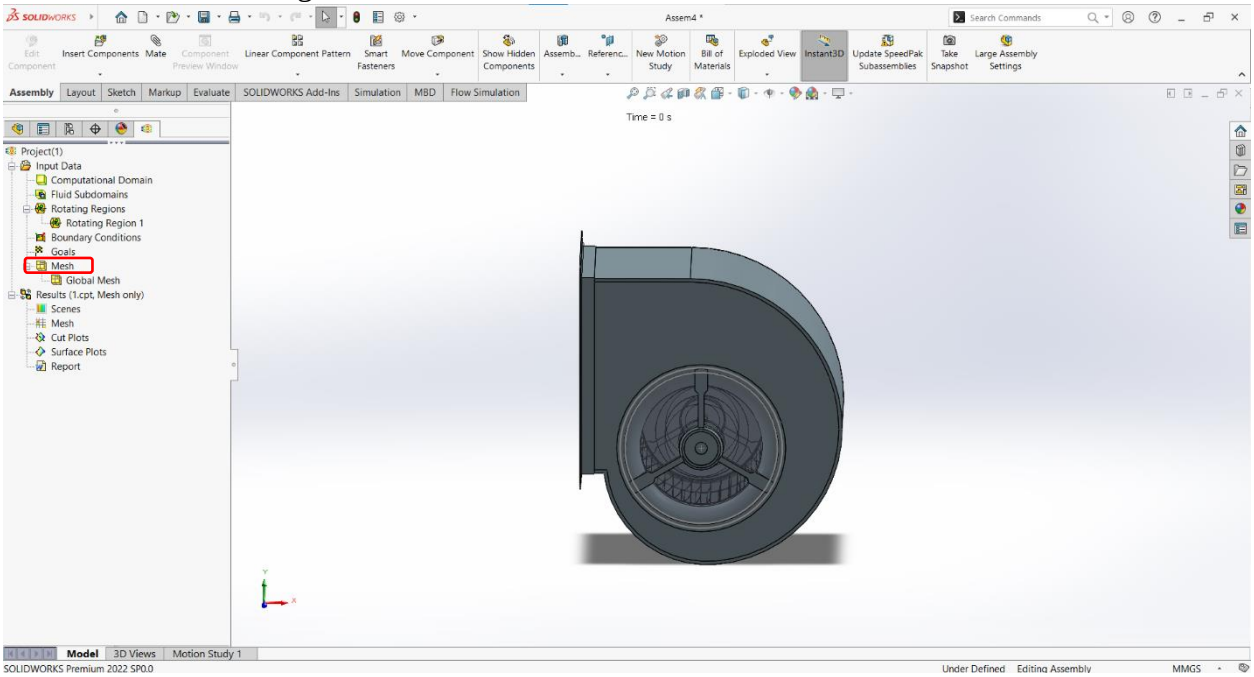


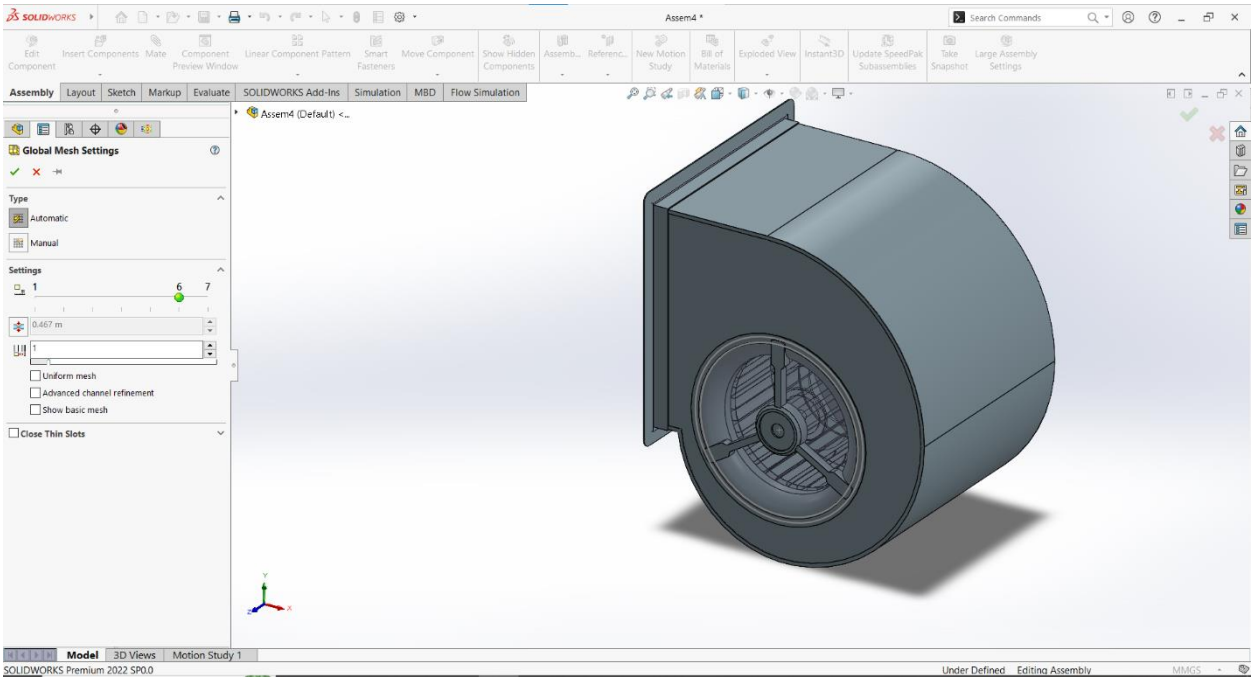
B2 Chọn vùng mô phỏng

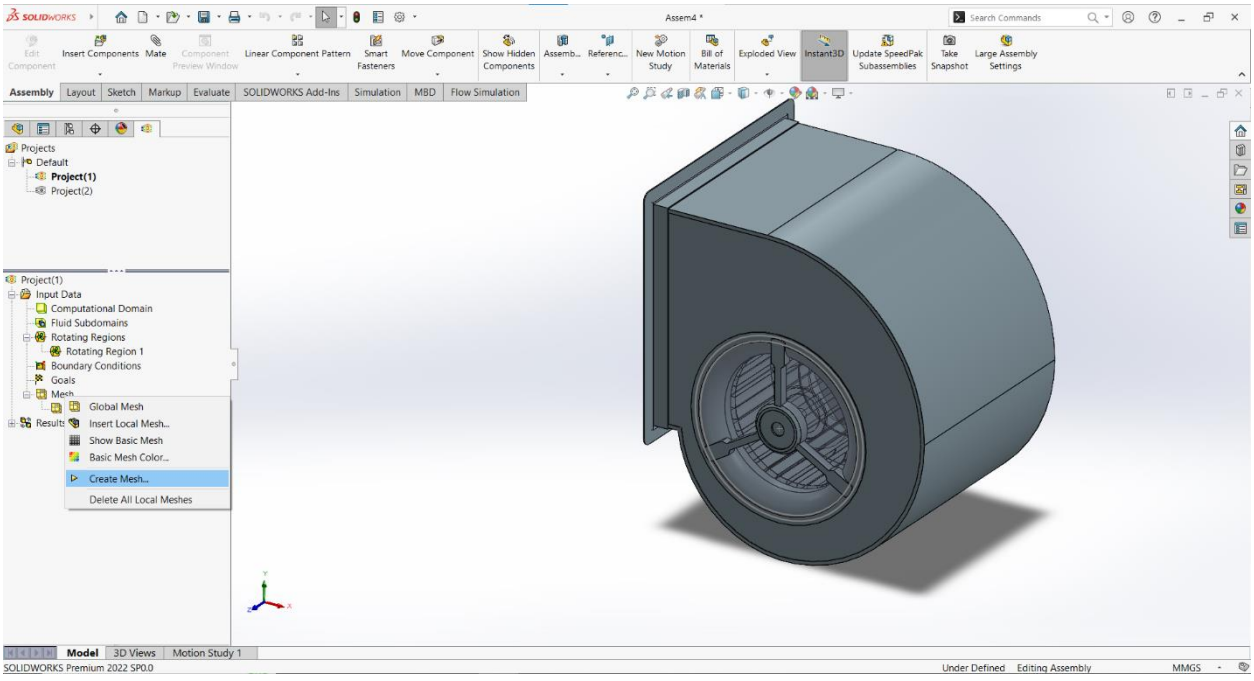


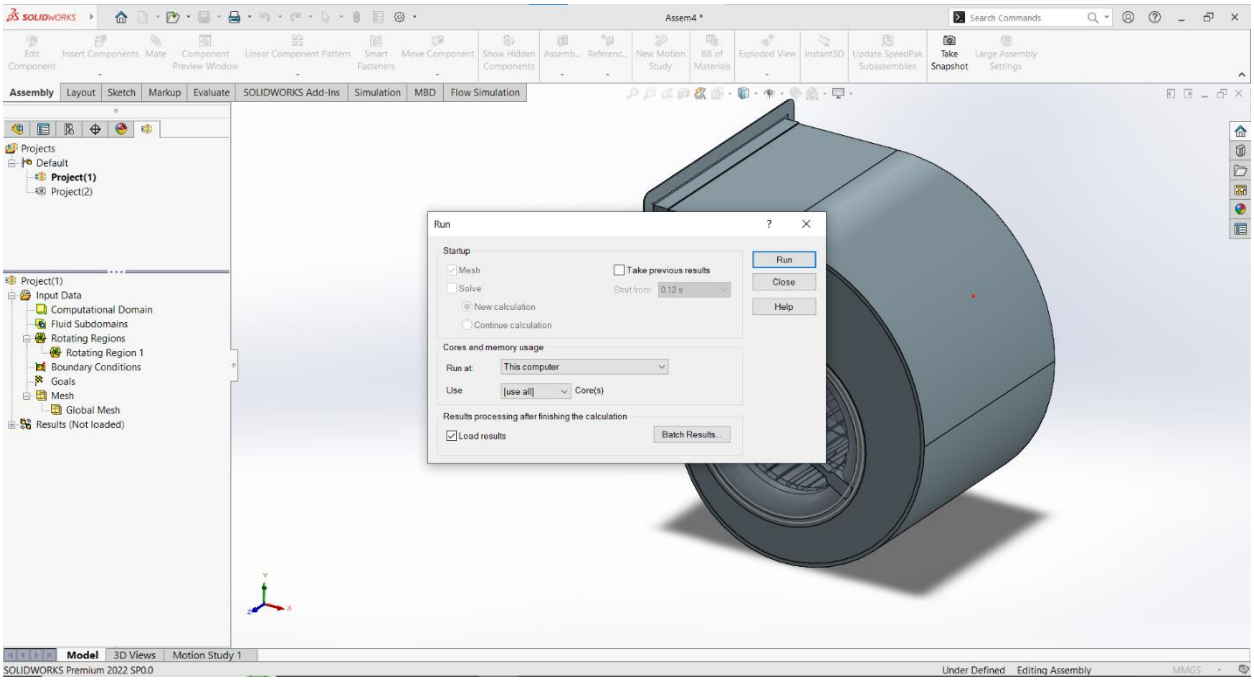


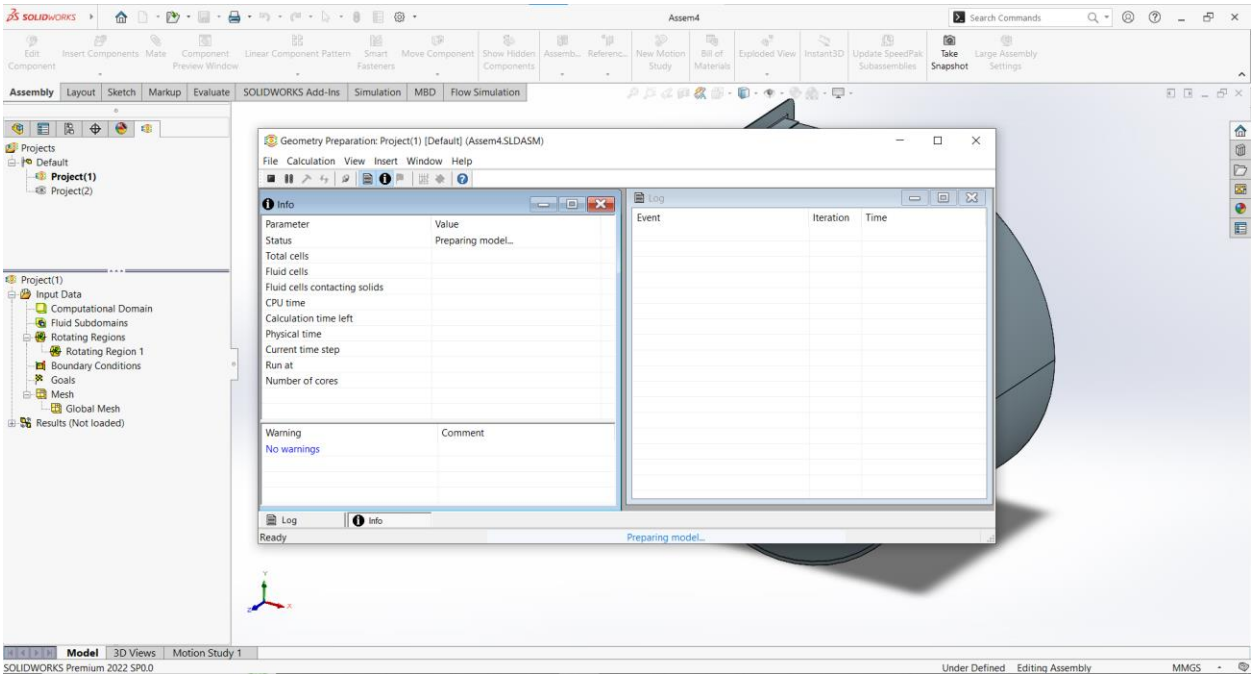
B3 Global Mesh Settings

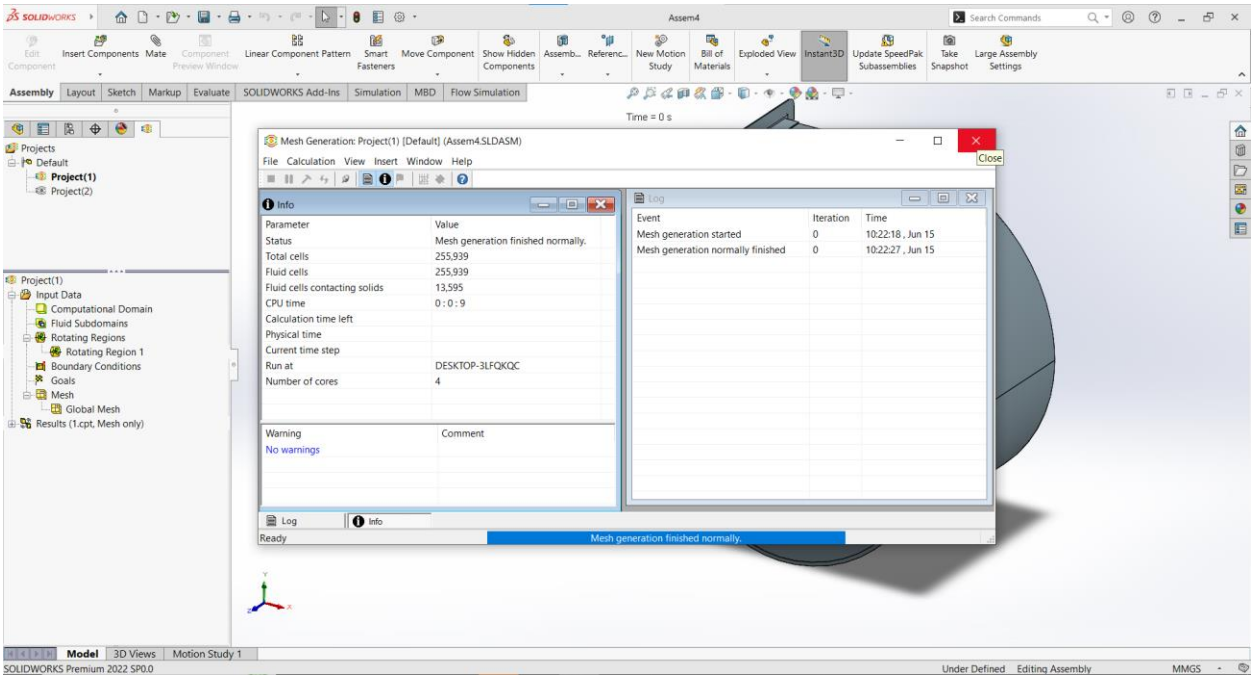



Assem4 *
Search Commands
Assembly
Layout
Sketch
Markup
Evaluate
SOLIDWORKS Add-Ins
Simulation
MBD
Flow Simulation
Assem4 (Default) <...
Global Mesh Settings
Type
Automatic
Manual
Settings
0.467 m
Uniform mesh
Advanced channel refinement
Show basic mesh
Close Thin Slots
Model
3D Views
Motion Study 1
SOLIDWORKS Premium 2022 SP0.0
Under Defined
Editing Assembly
MMGS

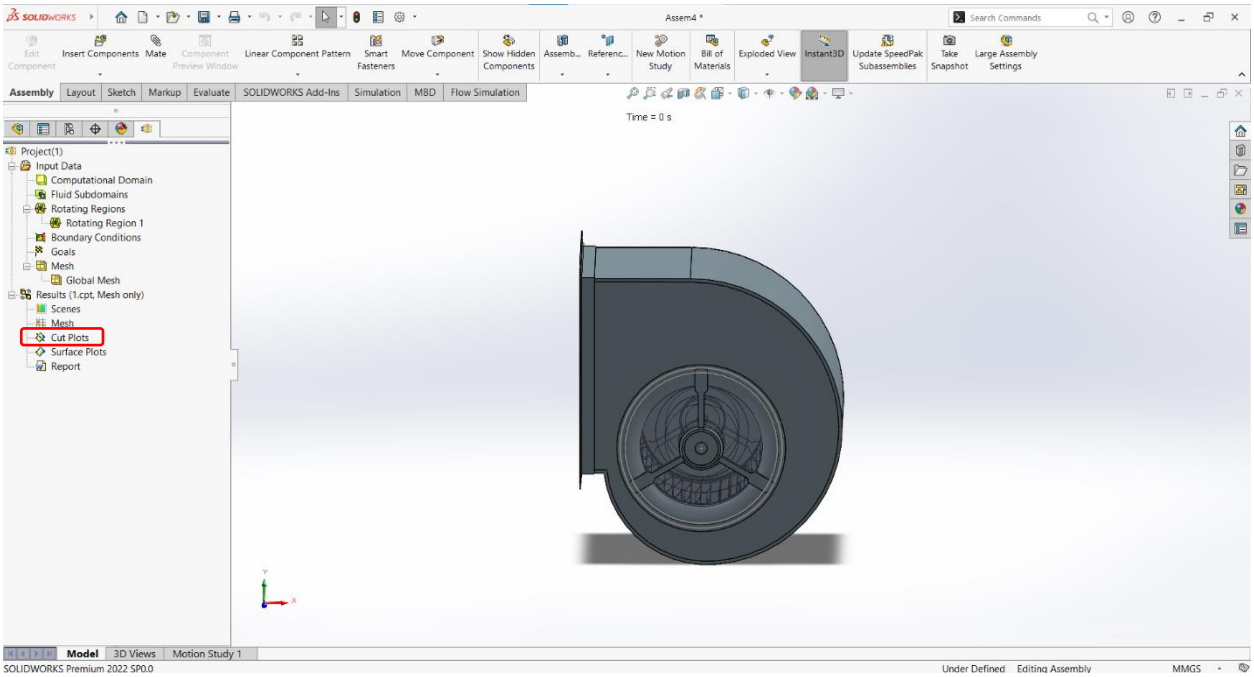

Assem4 *
Search Commands
Assembly
Layout
Sketch
Markup
Evaluate
SOLIDWORKS Add-Ins
Simulation
MBD
Flow Simulation
Projects
Default
Project(1)
Project(2)
Project(1)
Input Data
Computational Domain
Fluid Subdomains
Rotating Regions
Rotating Region 1
Boundary Conditions
Goals
Mesh
Global Mesh
Insert Local Mesh...
Show Basic Mesh
Basic Mesh Color...
Create Mesh...
Delete All Local Meshes
Results
Model
3D Views
Motion Study 1
SOLIDWORKS Premium 2022 SP0.0
Under Defined
Editing Assembly
MMGS

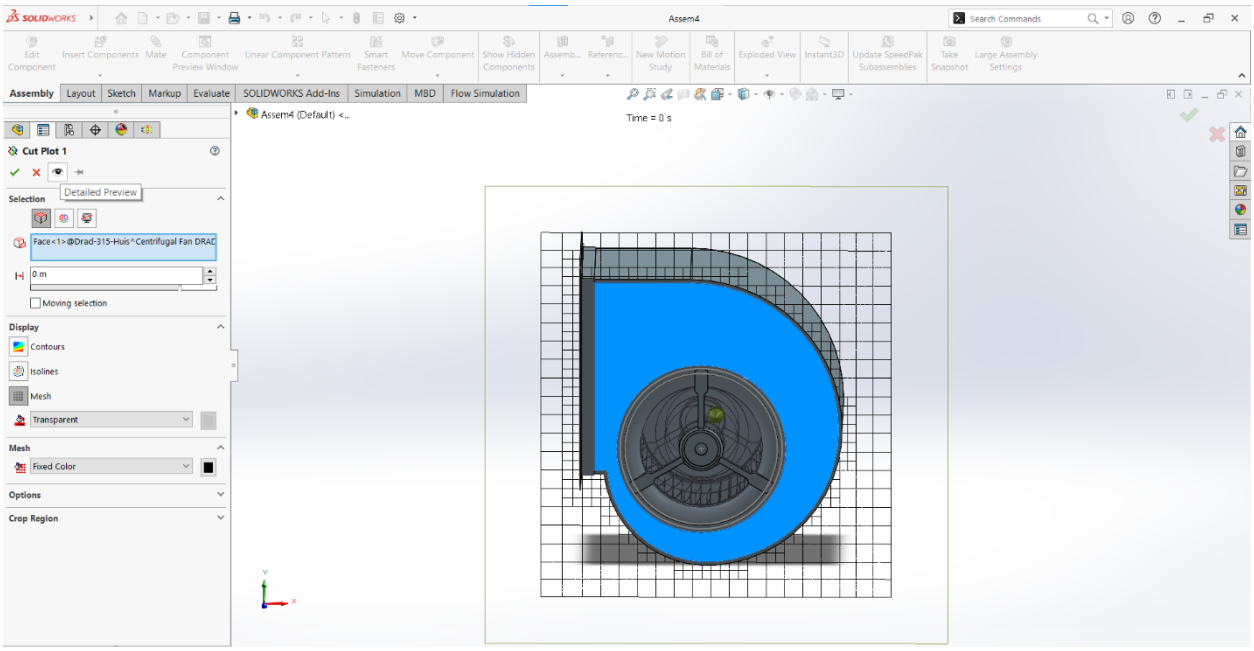

SOLIDWORKS
Assem4 *
Search Commands
Assembly
Layout
Sketch
Markup
Evaluate
SOLIDWORKS Add-Ins
Simulation
MBD
Flow Simulation
Projects
Default
Project(1)
Project(2)
Project(1)
Input Data
Computational Domain
Fluid Subdomains
Rotating Regions
Rotating Region 1
Boundary Conditions
Goals
Mesh
Global Mesh
Results (Not loaded)
Run
Startup
Mesh
Solve
New calculation
Continue calculation
Take previous results
Start from:
0.12 s
Run
Close
Help
Cores and memory usage
Run at:
This computer
Use
[use all]
Core(s)
Results processing after finishing the calculation
Load results
Batch Results...
Model
3D Views
Motion Study 1
SOLIDWORKS Premium 2022 SP0.0
Under Defined
Editing Assembly
MMGS


SOLIDWORKS
Assem4
Search Commands
Assembly
Layout
Sketch
Markup
Evaluate
SOLIDWORKS Add-Ins
Simulation
MBD
Flow Simulation
Projects
Default
Project(1)
Project(2)
Project(1)
Input Data
Computational Domain
Fluid Subdomains
Rotating Regions
Rotating Region 1
Boundary Conditions
Goals
Mesh
Global Mesh
Results (Not loaded)
Geometry Preparation: Project(1) [Default] (Assem4.SLDASM)
File
Calculation
View
Insert
Window
Help
Info
Parameter
Value
Status
Preparing model...
Total cells
Fluid cells
Fluid cells contacting solids
CPU time
Calculation time left
Physical time
Current time step
Run at
Number of cores
Warning
Comment
No warnings
Log
Event
Iteration
Time
Log
Info
Ready
Preparing model...
Model
3D Views
Motion Study 1
SOLIDWORKS Premium 2022 SP0.0
Under Defined
Editing Assembly
MMGS

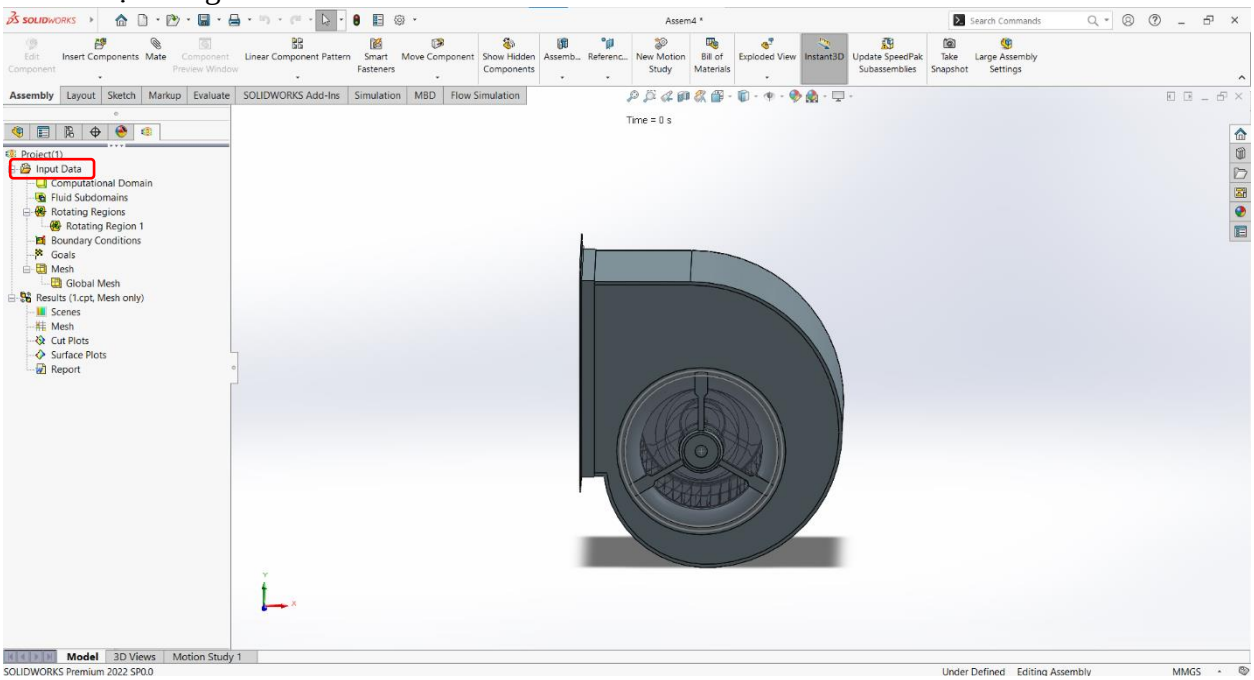

Assem4
Search Commands
Edit Component
Insert Components
Mate
Component Preview Window
Linear Component Pattern
Smart Fasteners
Move Component
Show Hidden Components
Assemb...
Referenc...
New Motion Study
Bill of Materials
Exploded View
Instant3D
Update SpeedPak Subassemblies
Take Snapshot
Large Assembly Settings
Assembly
Layout
Sketch
Markup
Evaluate
SOLIDWORKS Add-Ins
Simulation
MBD
Flow Simulation
Time = 0 s
Projects
Default
Project(1)
Project(2)
Project(1)
Input Data
Computational Domain
Fluid Subdomains
Rotating Regions
Rotating Region 1
Boundary Conditions
Goals
Mesh
Global Mesh
Results (1.cpt, Mesh only)
Mesh Generation: Project(1) [Default] (Assem4.SLDASM)
File Calculation View Insert Window Help
Close
Info
Parameter Value
Status Mesh generation finished normally.
Total cells 255,939
Fluid cells 255,939
Fluid cells contacting solids 13,595
CPU time 0 : 0 : 9
Calculation time left
Physical time
Current time step
Run at DESKTOP-3LFQKQC
Number of cores 4
Warning Comment
No warnings
Log
Event Iteration Time
Mesh generation started 0 10:22:18 , Jun 15
Mesh generation normally finished 0 10:22:27 , Jun 15
Log
Info
Ready
Mesh generation finished normally.
Model
3D Views
Motion Study 1
SOLIDWORKS Premium 2022 SP0.0
Under Defined
Editing Assembly
MMGS

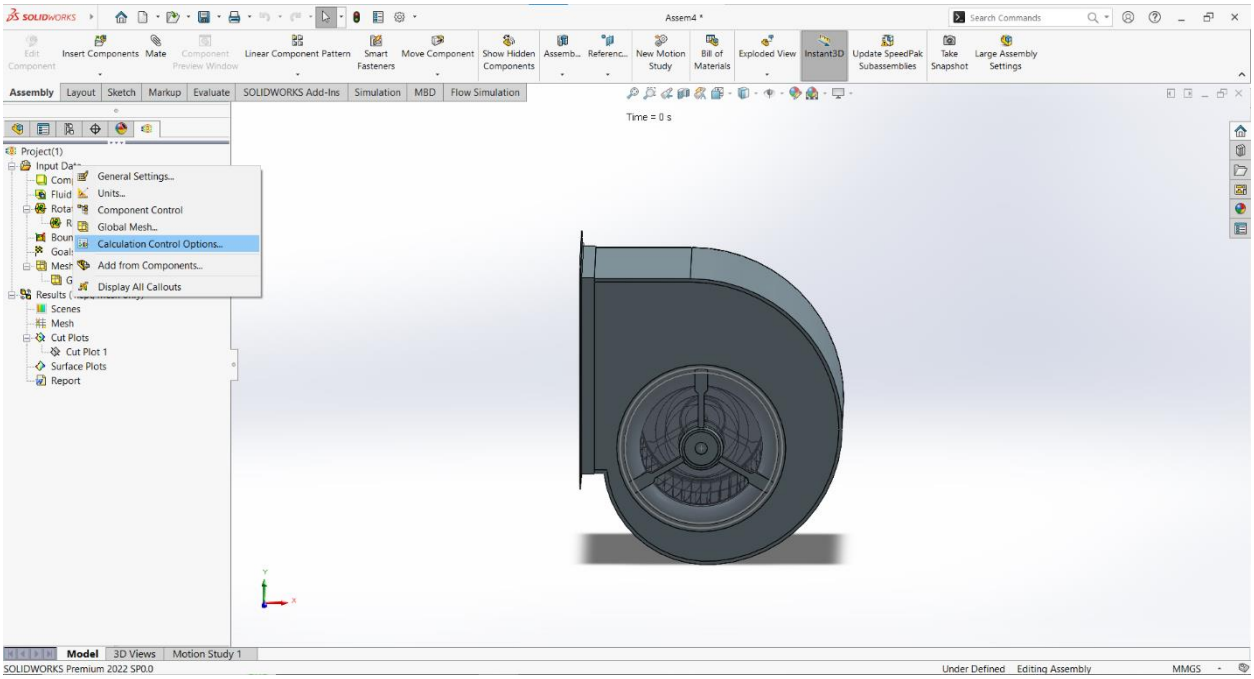
B4 Tạo mặt cắt Cut Plot

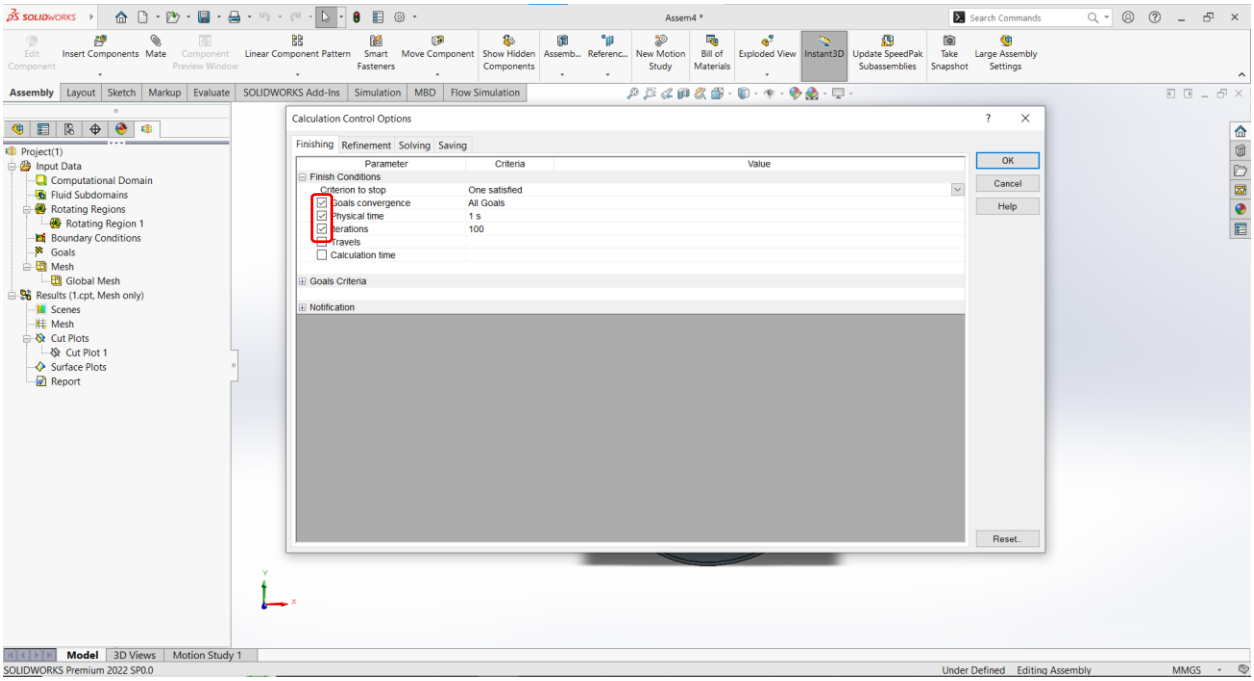


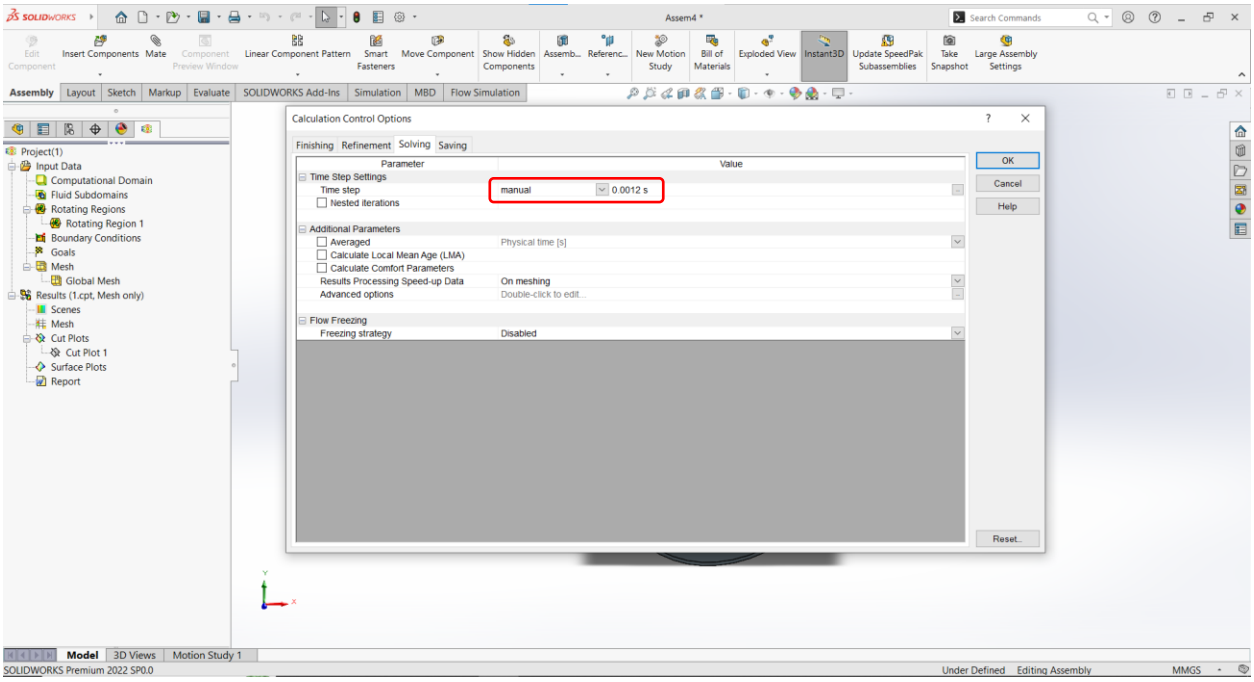


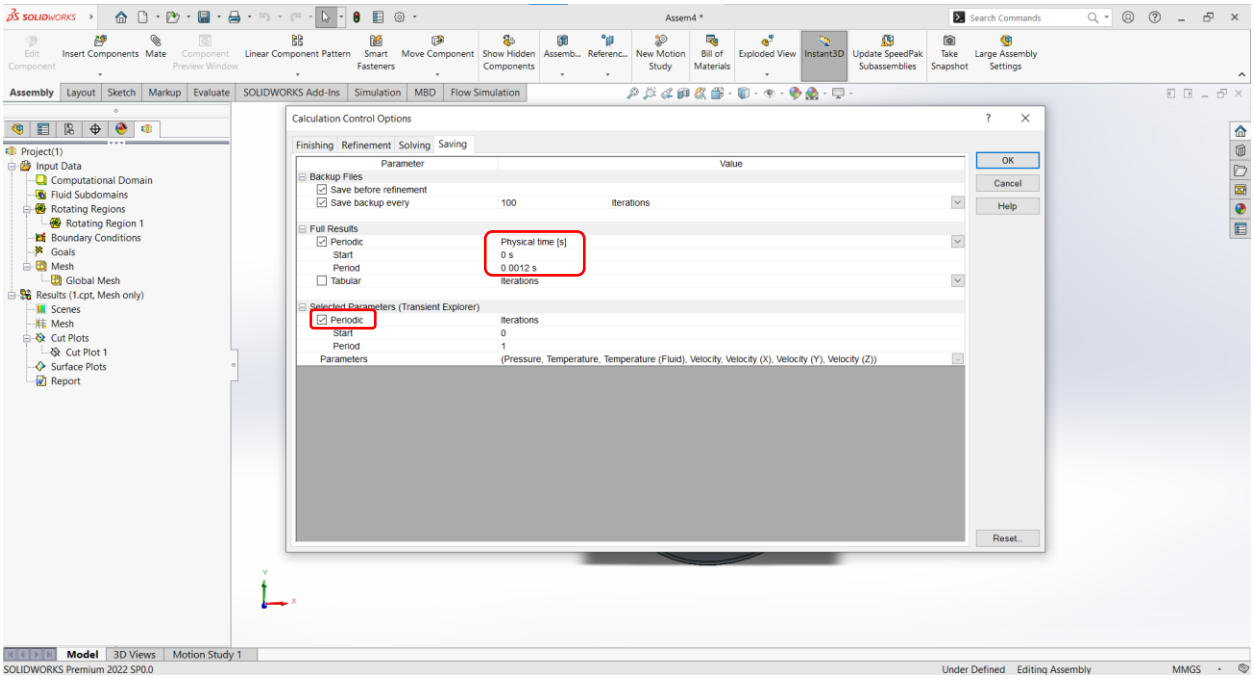
B5 Cài đặt thông số tính toán điều khiển

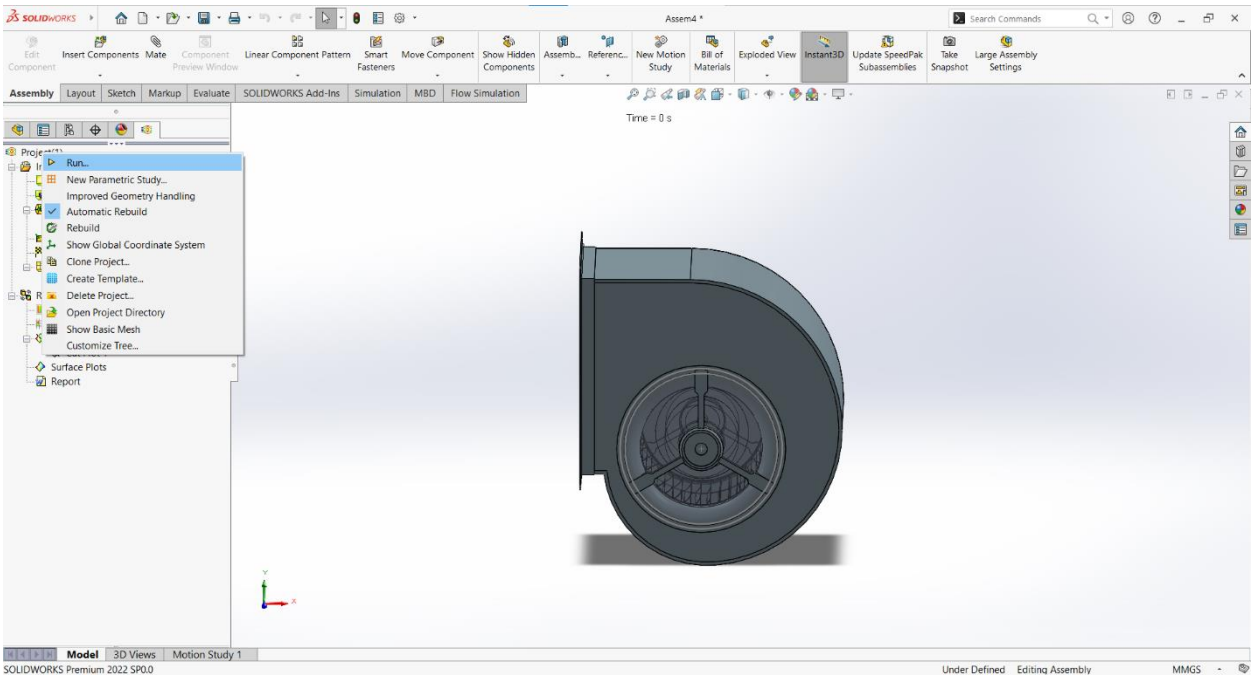


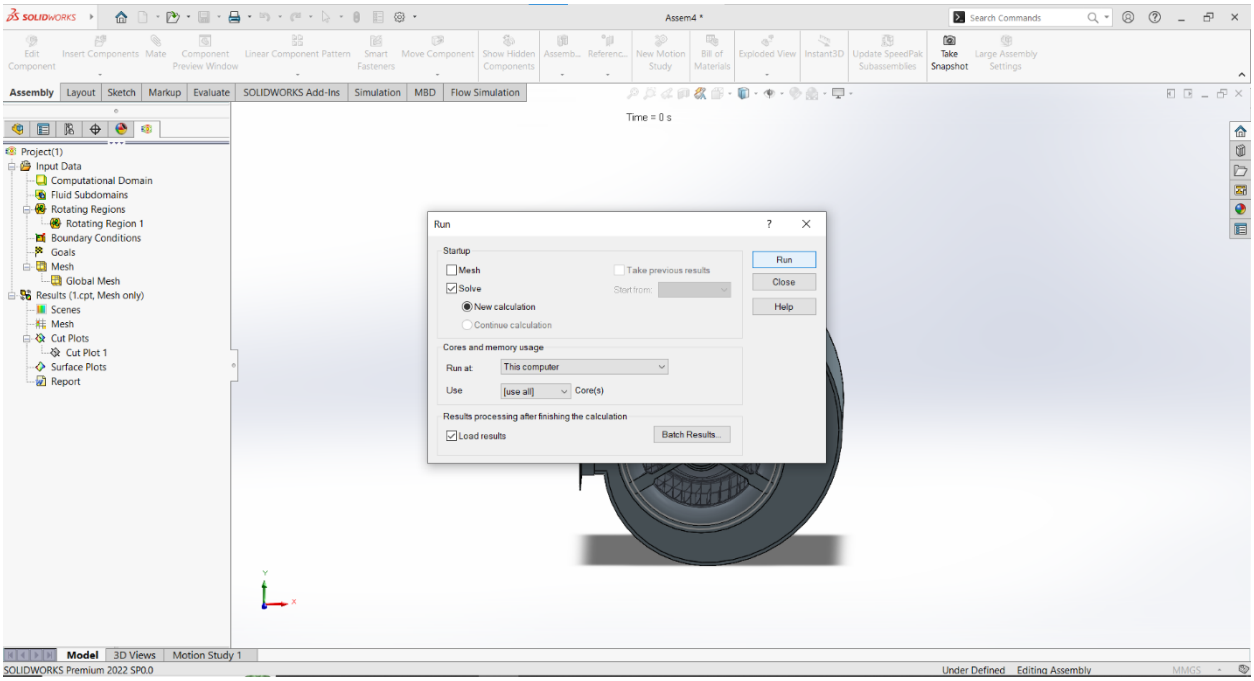


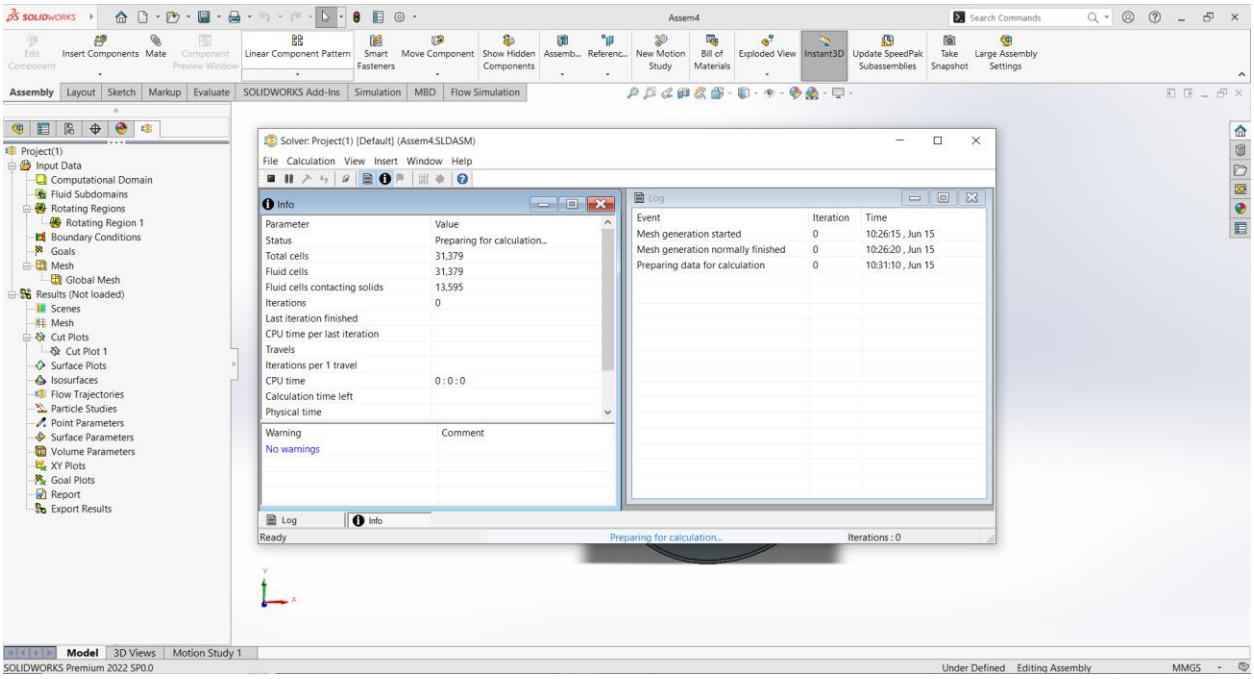

Calculation Control Options
Finishing
Refinement
Solving
Saving
Parameter
Criteria
Value
Finish Conditions
Criterion to stop
One satisfied
Goals convergence
All Goals
Physical time
1 s
Iterations
100
Travels
Calculation time
Goals Criteria
Notification
OK
Cancel
Help
Reset...
Project(1)
Input Data
Computational Domain
Fluid Subdomains
Rotating Regions
Rotating Region 1
Boundary Conditions
Goals
Mesh
Global Mesh
Results (1.cpt, Mesh only)
Scenes
Mesh
Cut Plots
Cut Plot 1
Surface Plots
Report
Model
3D Views
Motion Study 1
SOLIDWORKS Premium 2022 SP0.0
Under Defined
Editing Assembly
MMGS

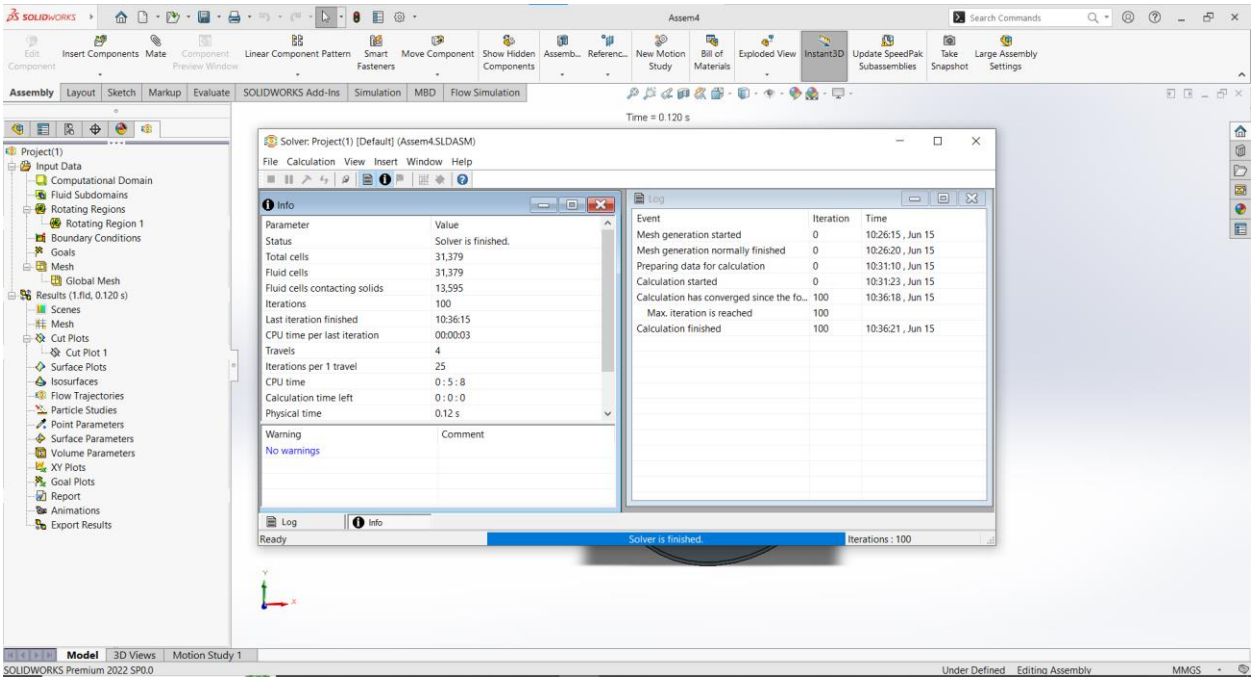

Calculation Control Options
Finishing
Refinement
Solving
Saving
Parameter
Value
Time Step Settings
Time step
manual
0.0012 s
Nested iterations
Additional Parameters
Averaged
Physical time [s]
Calculate Local Mean Age (LMA)
Calculate Comfort Parameters
Results Processing Speed-up Data
On meshing
Advanced options
Double-click to edit...
Flow Freezing
Freezing strategy
Disabled
OK
Cancel
Help
Reset...
Project(1)
Input Data
Computational Domain
Fluid Subdomains
Rotating Regions
Rotating Region 1
Boundary Conditions
Goals
Mesh
Global Mesh
Results (1.cpt, Mesh only)
Scenes
Mesh
Cut Plots
Cut Plot 1
Surface Plots
Report
Model
3D Views
Motion Study 1
SOLIDWORKS Premium 2022 SP0.0
Under Defined
Editing Assembly
MMGS


Calculation Control Options
Finishing
Refinement
Solving
Saving
Parameter
Value
Backup Files
Save before refinement
Save backup every
100
Iterations
Full Results
Periodic
Physical time [s]
Start
0 s
Period
0.0012 s
Tabular
Iterations
Selected Parameters (Transient Explorer)
Periodic
Iterations
Start
0
Period
1
Parameters
(Pressure, Temperature, Temperature (Fluid), Velocity, Velocity (X), Velocity (Y), Velocity (Z))
OK
Cancel
Help
Reset...
Project(1)
Input Data
Computational Domain
Fluid Subdomains
Rotating Regions
Rotating Region 1
Boundary Conditions
Goals
Mesh
Global Mesh
Results (1.cpt, Mesh only)
Scenes
Mesh
Cut Plots
Cut Plot 1
Surface Plots
Report
Model
3D Views
Motion Study 1
SOLIDWORKS Premium 2022 SP0.0
Under Defined
Editing Assembly
MMGS

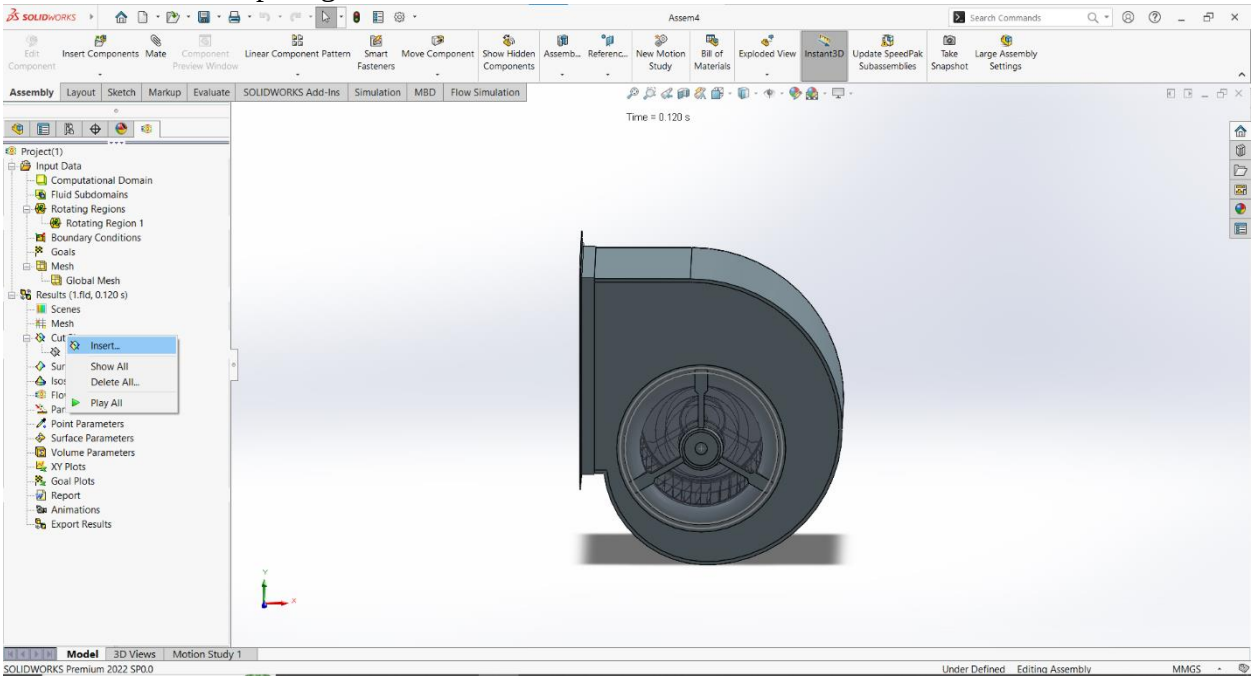

Time = 0 s
Run...
New Parametric Study...
Improved Geometry Handling
Automatic Rebuild
Rebuild
Show Global Coordinate System
Clone Project...
Create Template...
Delete Project...
Open Project Directory
Show Basic Mesh
Customize Tree...
Surface Plots
Report
Model
3D Views
Motion Study 1
SOLIDWORKS Premium 2022 SP0.0
Under Defined
Editing Assembly
MMGS

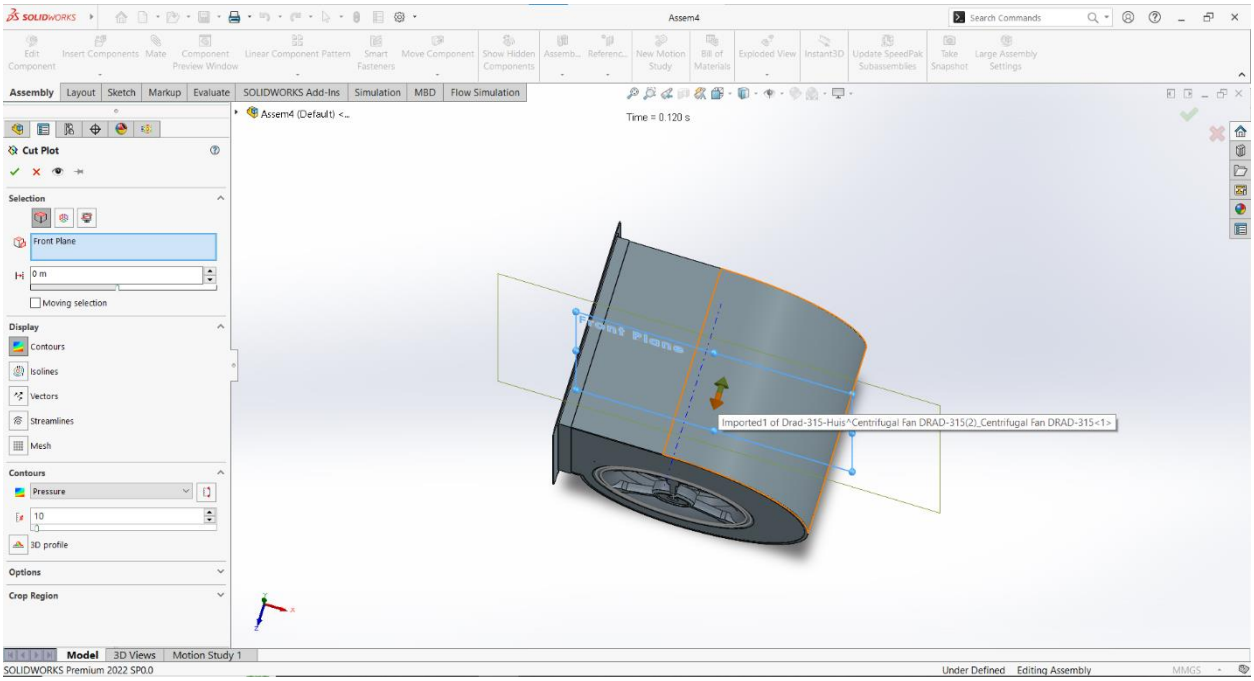

Assem4 *
Search Commands
Assembly
Layout
Sketch
Markup
Evaluate
SOLIDWORKS Add-Ins
Simulation
MBD
Flow Simulation
Time = 0 s
Project(1)
Input Data
Computational Domain
Fluid Subdomains
Rotating Regions
Rotating Region 1
Boundary Conditions
Goals
Mesh
Global Mesh
Results (1.cpt, Mesh only)
Scenes
Mesh
Cut Plots
Cut Plot 1
Surface Plots
Report
Run
Startup
Mesh
Take previous results
Solve
Start from:
New calculation
Continue calculation
Run
Close
Help
Cores and memory usage
Run at:
This computer
Use
[use all]
Core(s)
Results processing after finishing the calculation
Load results
Batch Results...
Model
3D Views
Motion Study 1
SOLIDWORKS Premium 2022 SP0.0
Under Defined
Editing Assembly
MMGS

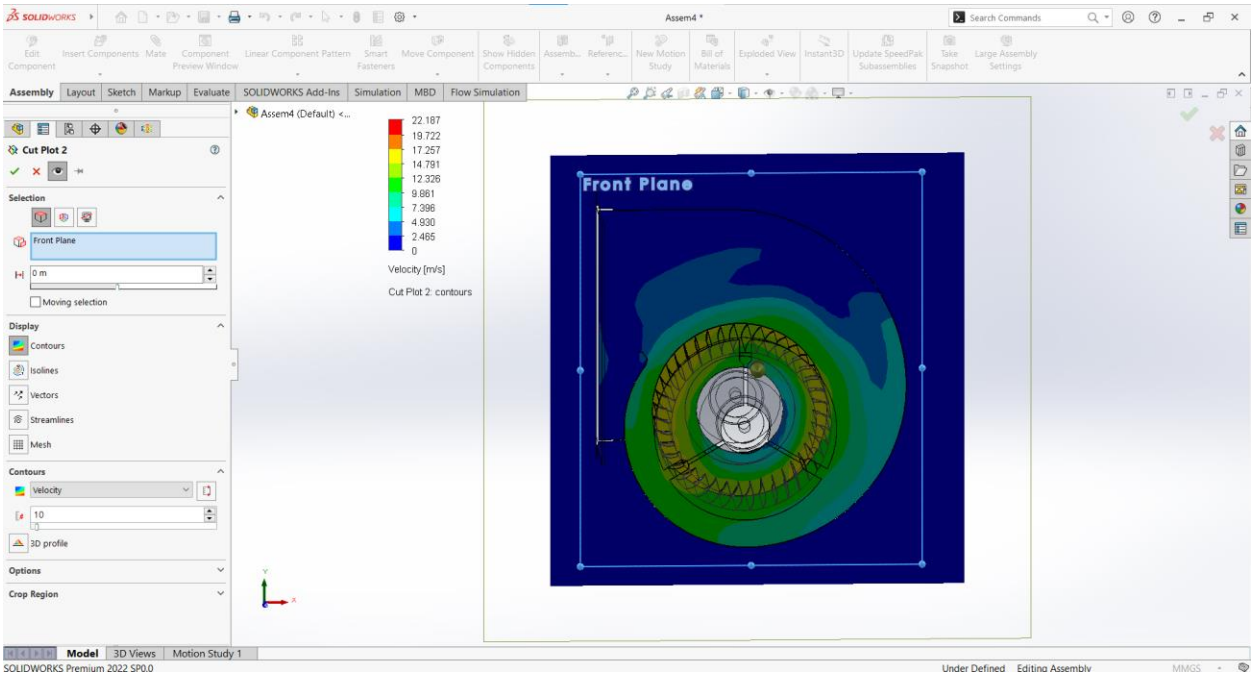

Assem4
Search Commands
Assembly
Layout
Sketch
Markup
Evaluate
SOLIDWORKS Add-Ins
Simulation
MBD
Flow Simulation
Solver: Project(1) [Default] (Assem4.SLDASM)
File
Calculation
View
Insert
Window
Help
Info
Parameter
Value
Status
Preparing for calculation...
Total cells
31,379
Fluid cells
31,379
Fluid cells contacting solids
13,595
Iterations
0
Last iteration finished
CPU time per last iteration
Travels
Iterations per 1 travel
CPU time
0 : 0 : 0
Calculation time left
Physical time
Warning
Comment
No warnings
Log
Event
Iteration
Time
Mesh generation started
0
10:26:15 , Jun 15
Mesh generation normally finished
0
10:26:20 , Jun 15
Preparing data for calculation
0
10:31:10 , Jun 15
Log
Info
Ready
Preparing for calculation...
Iterations : 0
Project(1)
Input Data
Computational Domain
Fluid Subdomains
Rotating Regions
Rotating Region 1
Boundary Conditions
Goals
Mesh
Global Mesh
Results (Not loaded)
Scenes
Mesh
Cut Plots
Cut Plot 1
Surface Plots
Isosurfaces
Flow Trajectories
Particle Studies
Point Parameters
Surface Parameters
Volume Parameters
XY Plots
Goal Plots
Report
Export Results
Model
3D Views
Motion Study 1
SOLIDWORKS Premium 2022 SP0.0
Under Defined
Editing Assembly
MMGS

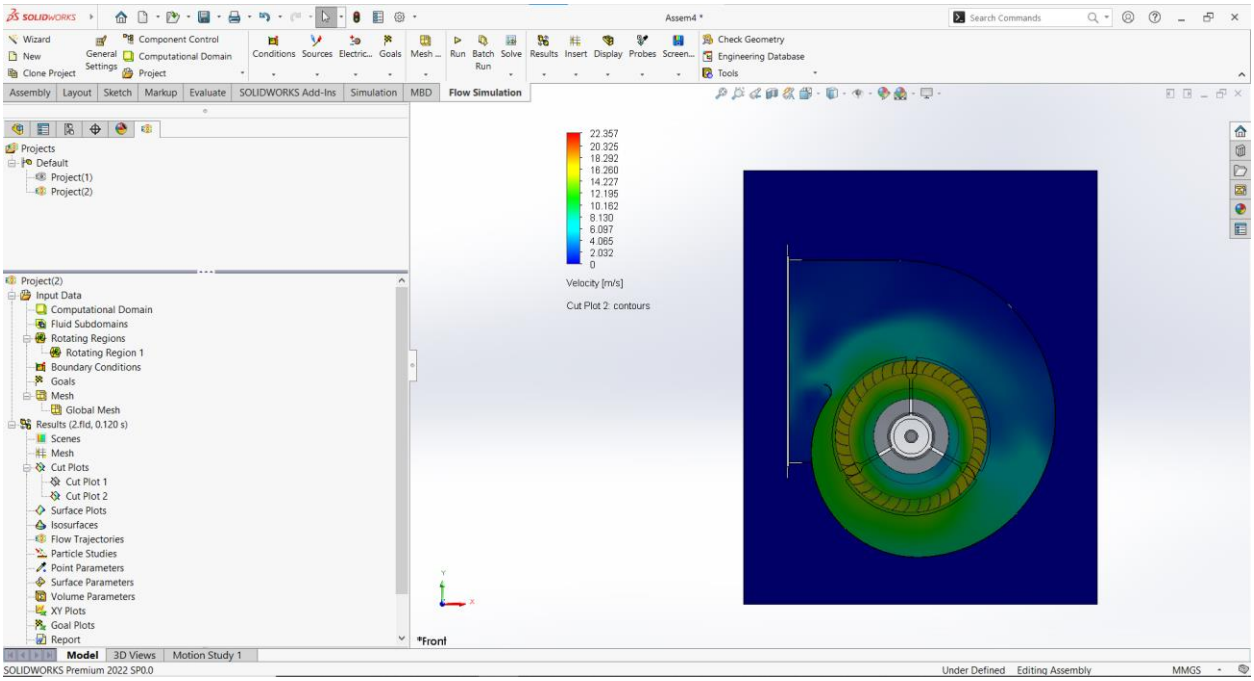


B6 Tạo mặt cắt mô phỏng tốc độ




Assem4
Search Commands
Assembly
Layout
Sketch
Markup
Evaluate
SOLIDWORKS Add-Ins
Simulation
MBD
Flow Simulation
Assem4 (Default) <...
Time = 0.120 s
Cut Plot
Selection
Front Plane
0 m
Moving selection
Display
Contours
Isolines
Vectors
Streamlines
Mesh
Contours
Pressure
10
3D profile
Options
Crop Region
Front Plane
Imported1 of Drad-315-Huis^Centrifugal Fan DRAD-315(2)_Centrifugal Fan DRAD-315<1>
Model
3D Views
Motion Study 1
SOLIDWORKS Premium 2022 SP0.0
Under Defined
Editing Assembly
MMGS


Assem4 *
Search Commands
Assembly
Layout
Sketch
Markup
Evaluate
SOLIDWORKS Add-Ins
Simulation
MBD
Flow Simulation
Assem4 (Default) <...
Cut Plot 2
Selection
Front Plane
0 m
Moving selection
Display
Contours
Isolines
Vectors
Streamlines
Mesh
Contours
Velocity
10
3D profile
Options
Crop Region
22.187
19.722
17.257
14.791
12.326
9.861
7.396
4.930
2.465
0
Velocity [m/s]
Cut Plot 2: contours
Front Plane
Model
3D Views
Motion Study 1
SOLIDWORKS Premium 2022 SP0.0
Under Defined
Editing Assembly
MMGS



Buổi chiều

Làm báo cáo và mô phỏng video

video mô phỏng quạt ốc sên.mp4

Ngày 8 tháng 6 năm 2023

Buổi sáng

Kiểm tra lại code xe dò line

Code

```
float pTerm, iTerm, dTerm;
int error, previousError;
float kp = 18, ki = 0, kd = 18;// 15
float output;
int integral, derivative;
int motor1newSpeed;
int motor2newSpeed;

int sensorPins[5] = {A1, A2, A3, A4, A5};
int motorPins[6] = {12, 6, 13, 11, 3, 5};
int s = 125;// max 120
int motor1Speed    = s; //Default r
int motor2Speed    = s; //Default l
```

```
13.
14. void setup() {
15.   for (int i = 0; i < 5; i++) {
16.     pinMode(sensorPins[i], INPUT_PULLUP);
17.   }
18.
19.   for (int i = 0; i < 6; i++) {
20.     pinMode(motorPins[i], OUTPUT);
21.   }

22.   Serial.begin(9600);
23. }
24. void calculateError() {
25.   int sensorValues[5];
26.   sensorValues[0] = digitalRead(A1);
27.   sensorValues[1] = digitalRead(A2);
28.   sensorValues[2] = digitalRead(A3);
29.   sensorValues[3] = digitalRead(A4);
30.   sensorValues[4] = digitalRead(A5);

31.   int errorValues[13][5] = {
32.     {0, 1, 1, 1, 1},   // 6
33.     {0, 0, 1, 1, 1},   // 5
34.     {0, 0, 0, 1, 1},   // 4
35.     {0, 0, 0, 0, 1},   // 3
36.     {1, 0, 1, 1, 1},   // 2
37.     {1, 0, 0, 1, 1},   // 1
38.     {1, 1, 0, 1, 1},   // 0
39.     {1, 1, 0, 0, 1},   // -1
40.     {1, 1, 1, 0, 1},   // -2
41.     {1, 0, 0, 0, 0},   // -3
42.     {1, 1, 0, 0, 0},   // -4
43.     {1, 1, 1, 0, 0},   // -5
44.     {1, 1, 1, 1, 0},   // -6  100 30
45.   };

46.   for (int i = 0; i < 13; i++) {
47.     bool match = true;
48.     for (int j = 0; j < 5; j++) {
49.       if (sensorValues[j] != errorValues[i][j]) {
50.         match = false;
51.         break;
52.       }
53.     }
54.     if (match) {
55.       error = i - 6;
56.       break;
```

```
    }
  }
}
void pidCalculations()  {
  pTerm = kp * error;
  integral += error;
  iTerm = ki * integral;
  derivative = error - previousError;
  dTerm = kd * derivative;
  output  = pTerm + iTerm + dTerm;
  previousError = error;
}

void changeMotorSpeed() {
  // Check if all IR readings are 0
  if ((digitalRead(A1) == 0) && (digitalRead(A2) == 0) && (digitalRead(A3) == 0) &&
  (digitalRead(A4) == 0) && (digitalRead(A5) == 0)) {

    analogWrite(3, 0);
    analogWrite(5, 0);
    digitalWrite(12, 0);
    digitalWrite(6, 0);
    digitalWrite(13, 0);
    digitalWrite(11, 0);
  } else {

    // Change motor speed of both motors accordingly
    motor2newSpeed = motor2Speed + output;
    motor1newSpeed = motor1Speed - output;
    int speedThresholds[] = {233, 215, 197, 179, 143};

    for (int i = 0; i < sizeof(speedThresholds) / sizeof(speedThresholds[0]); i++) {
      if (motor1newSpeed == speedThresholds[i]) {
        motor1newSpeed = s;
      }
      if (motor2newSpeed == speedThresholds[i]) {
        motor2newSpeed = s;
      }
    }

    // Constrain the new speed of motors to be between the range 0-255
    motor2newSpeed = constrain(motor2newSpeed, 0, 255);
    motor1newSpeed = constrain(motor1newSpeed, 0, 255);
    // Set new speed and run motors in the forward direction
    analogWrite(5, motor2newSpeed);
    analogWrite(3, motor1newSpeed);
    digitalWrite(12, 1);
```

```
98.     digitalWrite(6, 1);
99.     digitalWrite(13, 0);
100.              digitalWrite(11, 0);
101.            }
102.          }
103.          void  loop() {
104.            calculateError();
105.            pidCalculations();
106.            changeMotorSpeed();
107.            Serial.println(output);
108.            Serial.print("motor1newSpeed: ");
109.            Serial.println(motor1newSpeed);
110.            Serial.print("motor2newSpeed: ");
111.            Serial.println(motor2newSpeed);
112.            //delay(100);
113.          }
```

Buổi chiều

Ngày 9 tháng 6 năm 2023

Buổi sáng

Buổi chiều