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OF TECHNOLOGY

Oevning 1

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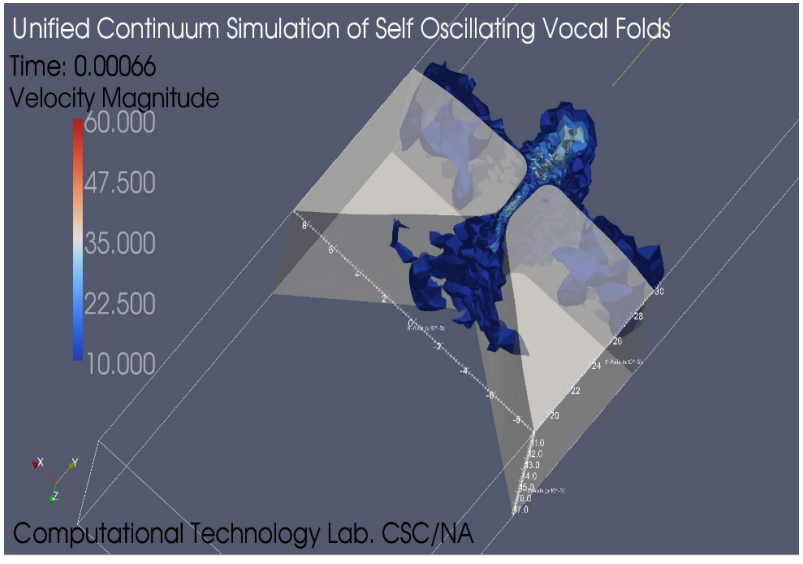
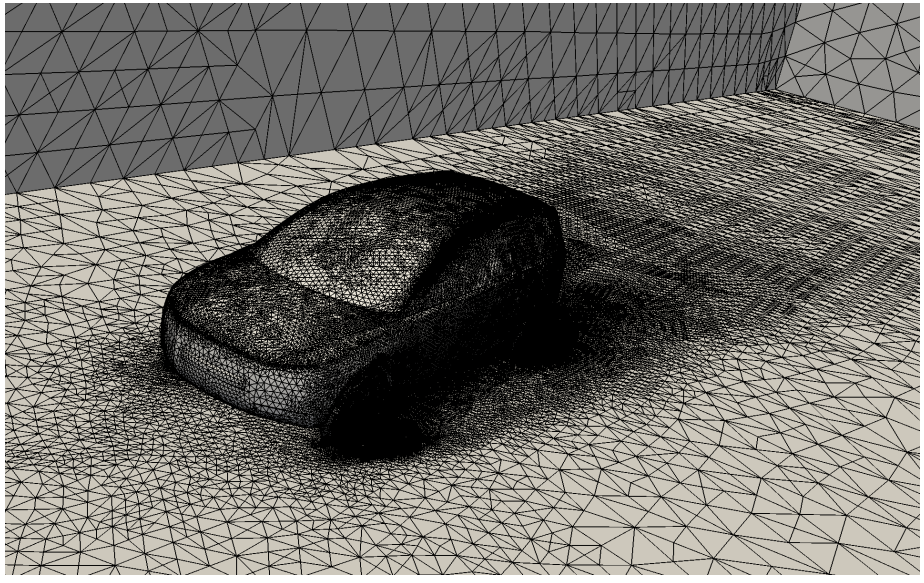
Numerisk Analys





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Peng 2.1: Matrix

Answer the following questions for the array bellow:

$$my\_array = \begin{bmatrix} 1.1 & 0.0 & 2.1 & -3.5 & 6.0 \\ 0.0 & 1.1 & -6.6 & 2.8 & 3.4 \\ 2.1 & 0.1 & 0.3 & -0.4 & 1.3 \\ -1.4 & 5.1 & 0.0 & 1.1 & 0.0 \end{bmatrix}.$$

(a) What is the size of my_array?
(b) What is the value of $my\_array(4,1)$?
(c) What is the size and value of $my\_array(:,1:2)$?
(d) What is the size and value of $my\_array([13], end)$?

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Peng 2.6: Matrix

$$a = \begin{bmatrix} 2 & 1 \\ -1 & 4 \end{bmatrix}, \quad b = \begin{bmatrix} -1 & 3 \\ 0 & 2 \end{bmatrix}, \quad c = \begin{bmatrix} 2 \\ 1 \end{bmatrix}, \quad d = eye(2)$$

Which operations are illegal in Matlab and why?

a) a+b
b) a* d
c) a.*d
d) a*c
e) a.*c
f) a\ b
g) a.\b
h) a^b

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Peng 2.10: Plotting

Given the following equations for height and velocity of a ball:

$$h(t) = \frac{1}{2}gt^2 + v_0 t + h_0$$
$$v(t) = gt + v_0$$

Here, g is the acceleration due to gravity $(-9.81, m/s^2)$, h is the height above the surface of the Earth, and v is the vertical component of velocity. Write a MATLAB program that, given $v_0 = 0\ m/s$ and $h_0 = 10\ m$, plots the height and velocity as a function of time.

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Peng 3.3: IF statements

The following statements are intended to alert a user to dangerously high oral thermomenter readings (in Fahrenheit). Are they correct or not? If they are incorrect, explain why and correct them.

```
if temp < 97.5
    disp('Temperature below normal');
elseif temp > 97.5
   disp('Temperature normal');
   elseif temp > 99.5
   disp('Temperature slightly high');
elseif temp > 103.5
   disp('Temperature dangerously high');
end
```

```
if temp < 97.5
    disp('Temperature below normal');
elseif temp > 97.5
   disp('Temperature normal');
   elseif temp > 99.5
   disp('Temperature slightly high');
elseif temp > 103.5
   disp('Temperature dangerously high');
end

%corrected Version
temp = 99.5;
if temp < 97.5
    disp('Temperature below normal');
elseif (temp >= 97.5) && (temp < 99.5)
   disp('Temperature normal');
elseif (temp >= 99.5) && (temp < 103.5)
   disp('Temperature slightly high');
elseif temp >= 103.5
   disp('Temperature dangerously high');
end
```

Peng : 4.7a, 4.8a: FOR statments

Examine the following loop and determine the value of *ires* at the end of the loop and also the number of times each loop executes.

a)

```
ires=0;
for index=-10:10
    ires=ires+1;
end
```

b)

```
%PNG 4.8b
ires=0;
for index=10:-2:4
    if index ==6
        continue;
    end
    ires=ires+index;
end
```

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Peng : 4.19 Matlab Function

The nth Fibonacci Number is defined by the following recursive equations:

$$
\begin{aligned}
f(1) &= 1 \\
f(2) &= 2 \\
f(n) &= f(n-1) + f(n-2)
\end{aligned}
$$

Write an M-file to calculate and write out the nth Fibonacci number for $n > 2$, where n is input by the user. Use a while loop to perform the calculation.