The recent study report

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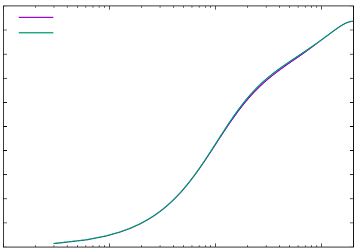
This report is about the work done in the last two weeks.At first,We installed Gnuplot and learned how to use it draw pictures quickly.Furthermore,we tried to write first code which can print out the length and type of the variable.At last,we have read Kim(1987).

TODO LIST:

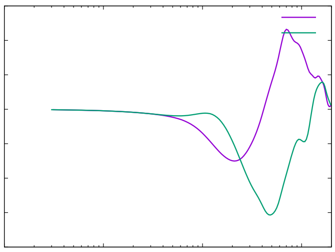
1. *Learn how to use **Gnuplot**.(Done)*
2. *Try to write first code about view the attributes in HDF files.(Done)*
3. *Read Kim(1987) very carefully to know what need to notice.(Done)*

1 Gnuplot

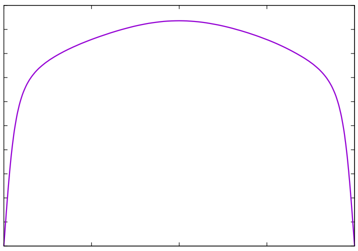
We have tried draw some pictures by gnuplot.



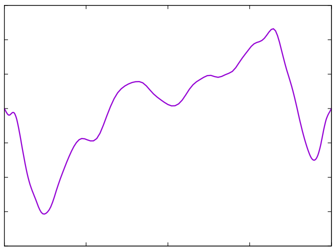
(a) u-sym



(b) uu-sym



(c) z-u



(d) z-uu

Figure 1: Pictures draw by Gnuplot

2 Python Code

We have write a code which can print variable's type ,length and shape.

```
~/C/DNS/output on master !3 ?13 ./var.py
please input varName:uu
<class 'h5py._hl.dataset.Dataset'>
201
(201, 386, 212)
```

Figure 2: Actual result

3 Kim(1987)

*Over the past period of time, we have read Kim(1987) in detail and learned some things that need attention.We Know the unsteady Navier-Stokes equations are solved numerically at a Reynolds number of 3300, based on thc mean centreline velocity and channel half-width, with about $4 * 10^4$ grid points (192 * 129 * 160 in x, y, z).By reading this paper, we learned that the following parameters need to be paid attention to.*

3.1 Mean properties

This section mainly discussed the mean-velocity profile.The skin-friction coefficient, bulk mean velocity, displacement and momentum thicknesses are also computed from the computed mean-velocity profile.

3.2 Turbulence intensities

This section mainly discussed the turbulence intensities near the wall normalized by the local mean velocity and root-mean-square pressure fluctuations normalized by the wall shear velocity.We need notice u_{rms},v_{rms},w_{rms} and p_{rms}.

3.3 Reynolds shear stress

This section mainly discussed the Reynolds shear stress normalized by the wall shear velocity and correlation coefficient of u' and u'.We need notice $\overline{u'v'}$.

3.4 Near-wall behaviour of Reynolds stresses

This section mainly discussed the near-wall behaviour of Reynolds stresses We need notice u^+_{rms},v^+_{rms} and w^+_{rms}.

3.5 Vorticity

This section mainly discussed the comparison of the near-wall behaviour of the normal velocity fluctuation.We need notice root-mean-square vorticity fluctuations normalized by the mean shear.($\omega_x \upsilon/u_\tau^2$,$\omega_x \upsilon/u_\tau^2$ and $\omega_x \upsilon/u_\tau^2$).

3.6 Quadrant analysis

This section mainly discussed the analysis divides the Reynolds shear stress into four categories according to the signs of u' and v'.

3.7 Higher-order statistics

This section mainly discussed that agreements among the computed and measured values are satisfactory for u' and w', but there exists a significant discrepancy for v', especially for the flatness factor in the vicinity of the wall.

3.8 Summary

In particular, the computed Reynolds stresses - both the normal and the shear stresses - are consistently lower than the measured values, while the computed vorticity fluctuations at the wall are higher than the experimental values. One source of the discrepancy might be related to the measurement of the wall-shear velocity u_τ*. Another source of the discrepancy may be the test section of the oil channel used in the aforementioned experiments.*