The Cantera 1.5 Python Demos

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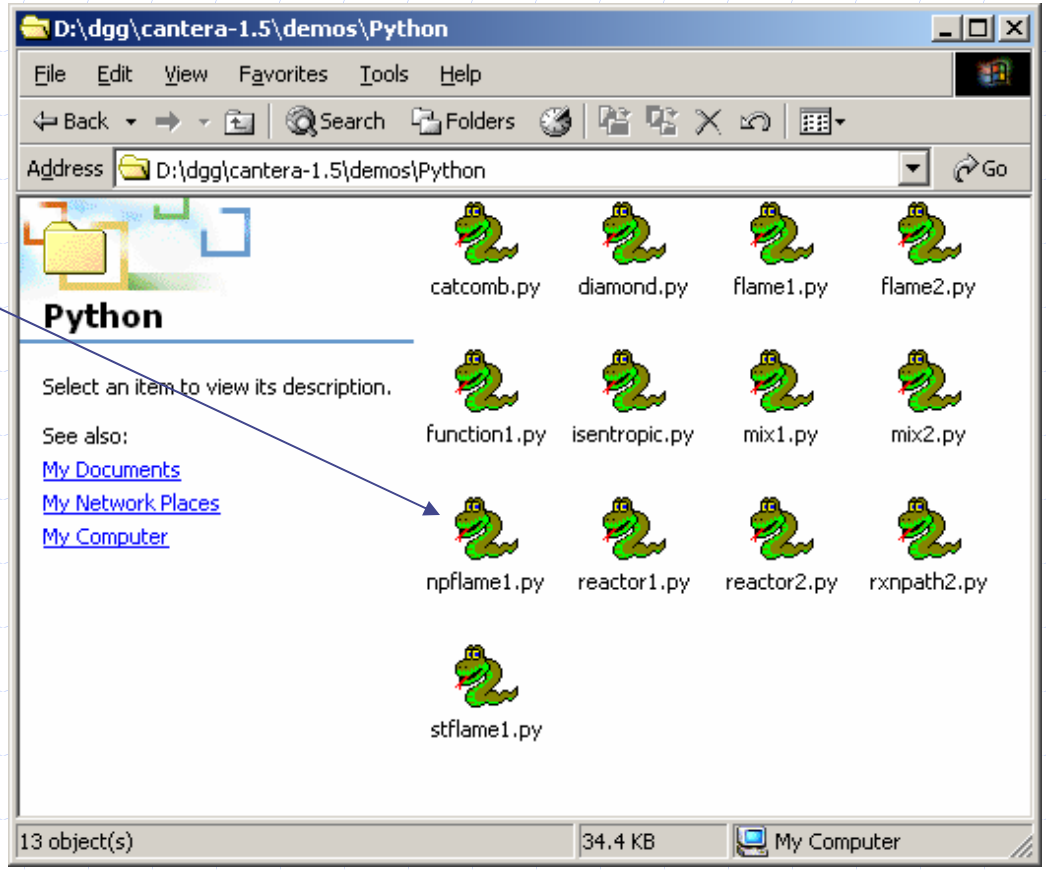
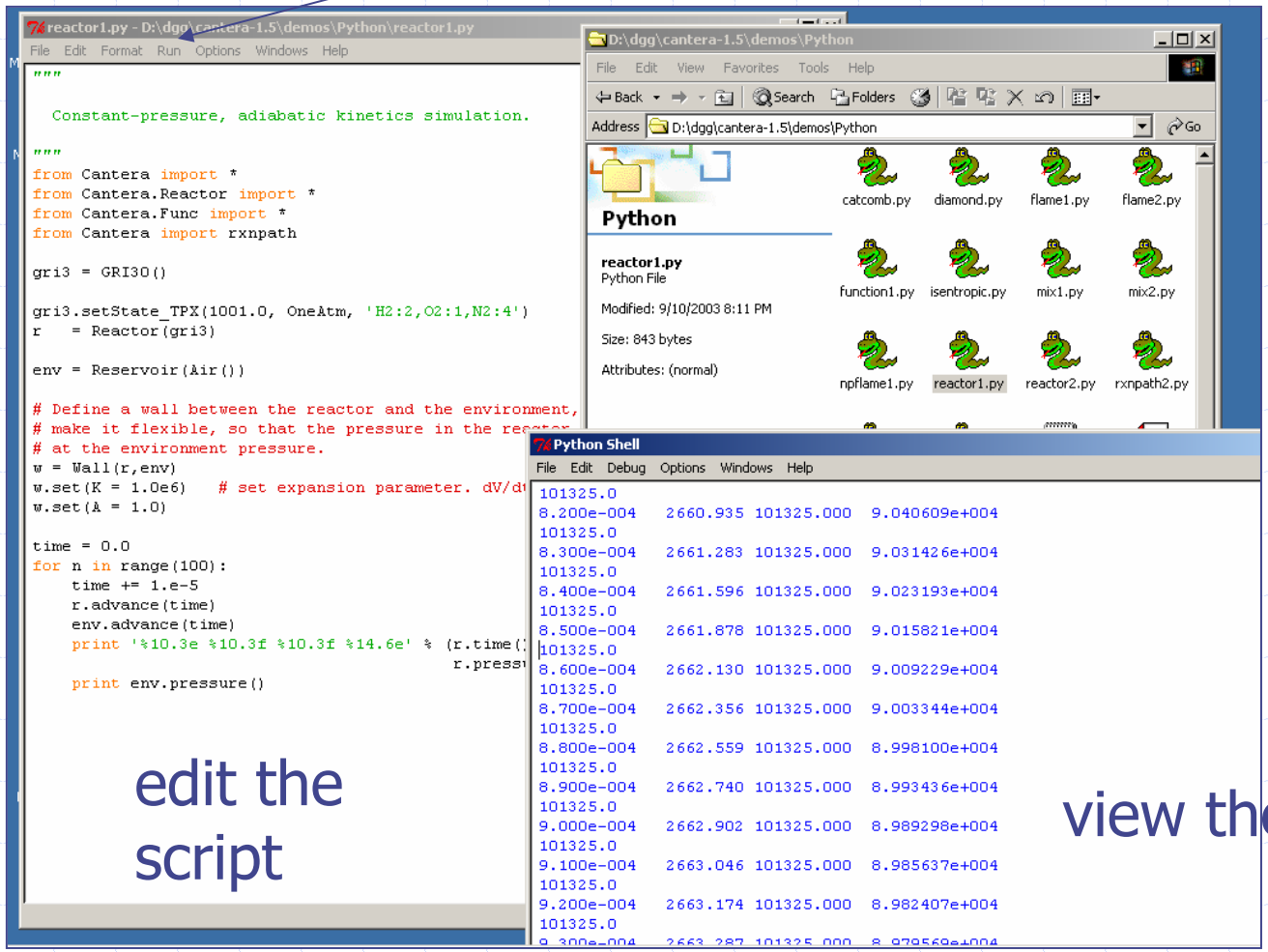
The Cantera Python demos are located in the demos/python folder

Double-click to launch, or right-click and choose 'Edit with Idle"



Using IDLE

run it



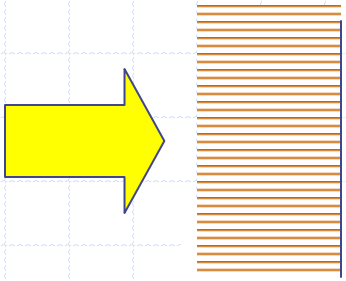
edit the script

view the output

Plots

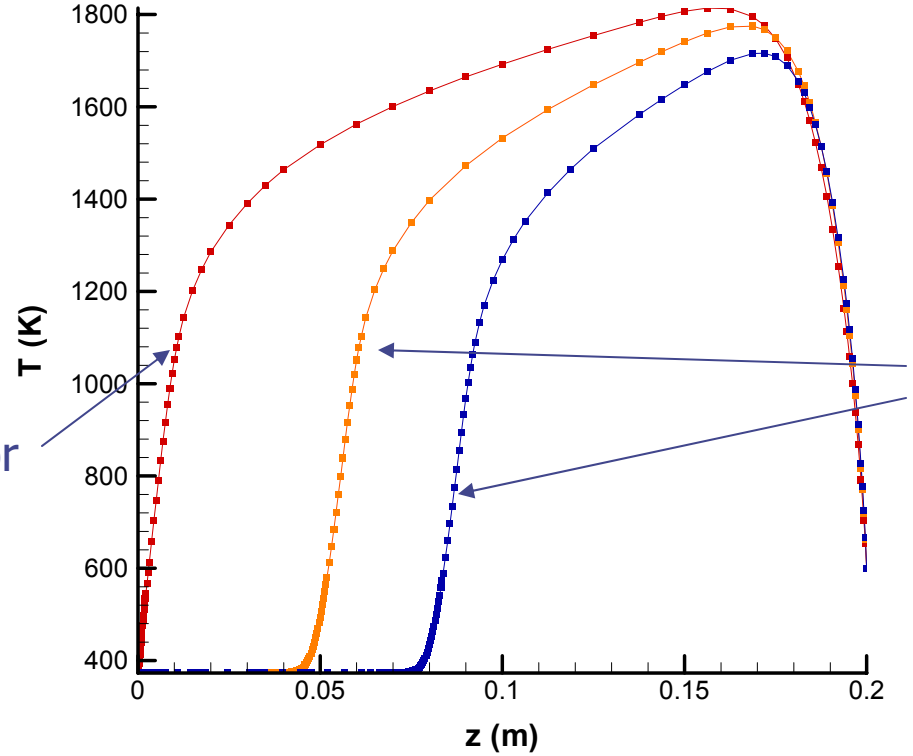
- Python does not have built-in graphics like MATLAB does, but it is easy to generate CSV files that can be read by Excel, MATLAB, or other plotting programs.
- A Python interface to GNU-Plot is also available in the SciPy package.
- The Cantera demos mostly write CSV files.

stflame1.py: Stagnation-point $H_2/O_2/Ar$ flame for a range of mass flow rates



surface

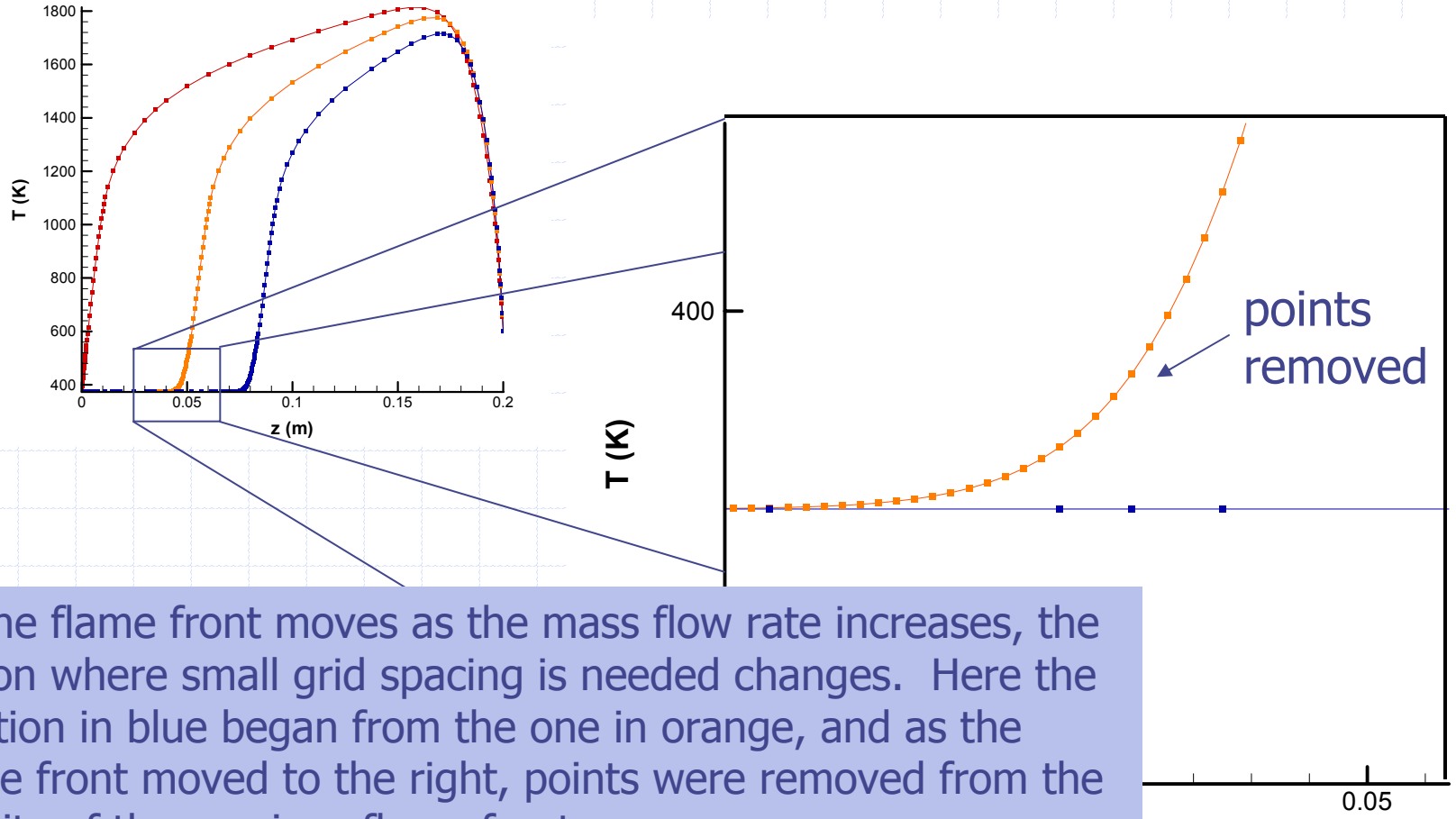
premixed fuel / air



attached flame for low mass flow rate

detached flames for higher mass flow rates

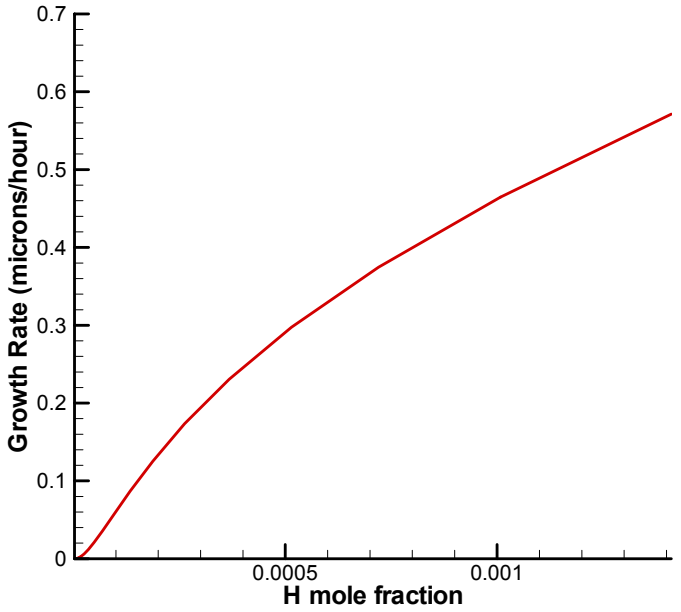
Grid can not only be refined, but also "pruned" of unnecessary points



As the flame front moves as the mass flow rate increases, the region where small grid spacing is needed changes. Here the solution in blue began from the one in orange, and as the flame front moved to the right, points were removed from the vicinity of the previous flame front.

diamond.py: Diamond chemical vapor deposition

- Simplified form of a growth mechanism for diamond (100) [Harris and Goodwin, J. Phys. Chem. **97**:23-28 (1993)]
- Surface phase with 8 species, 19 reversible reactions, 1 irreversible reaction
- Two bulk phases (gas, solid diamond)



For some problems, both Python and MATLAB demo scripts are provided

- Catalytic combustion (catcomb.py/catcomb.m)
- Non-premixed counterflow flame (npflame1.py/diffflame.m)
- Isentropic expansion (isentropic.py/istentropic.m)
- Burner-stabilized flame (flame1.py/flame1.m)
- Zero-D kinetics (reactor1.py/reactor1.m)
- See the MATLAB demos presentation for more information about these.