Monthly Summary: September, 2020

The primary goal of the work this month was the development of an interface between existing PSCAD code and `QRFactor`. This process required a fundamental shift in the implementation of `QRFactor` from a more standard, single-file CUDA project to a more object-oriented approach. In figure 1, we present a schematic of the structure of the QRFactor class.

See Chapter 6 in the CUDA NVCC Guide.

Example of separate compilation and linking with mixed host and device functions.

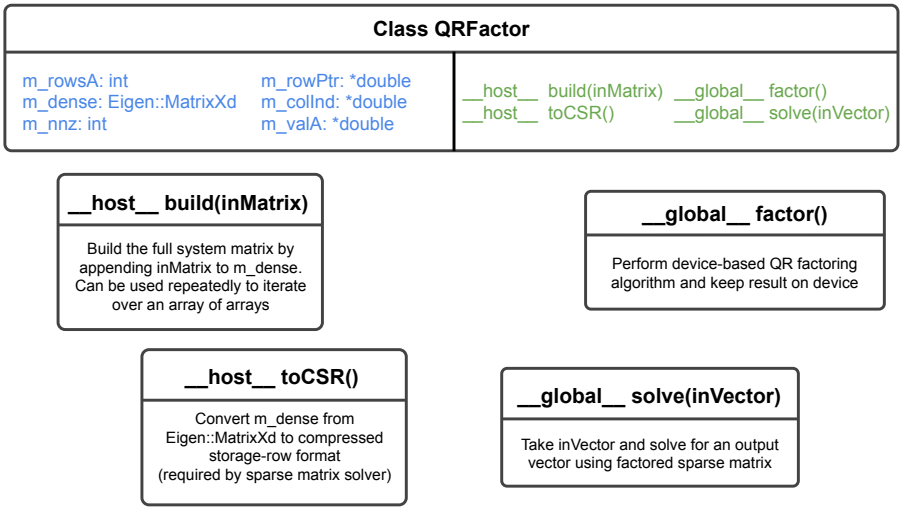

Figure 1: Schematic of the QRFactor class. Class variables are shown in blue while class functions are shown in green.

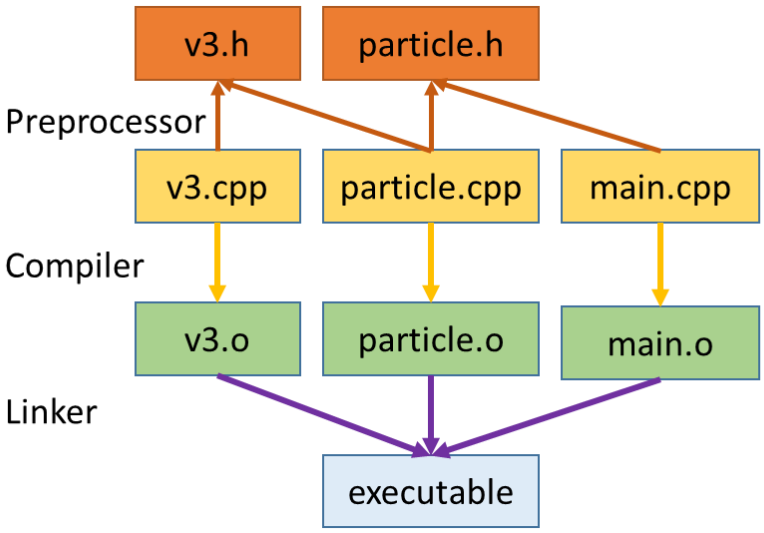

Figure 2: C++ build structure for a sample program. Image credit NVIDIA blog.

```
objects = main.o particle.o v3.o

all: $(objects)
    nvcc -arch=sm_20 $(objects) -o app

%.o: %.cpp
    nvcc -x cu -arch=sm_20 -I. -dc $< -o $@

clean:
    rm -f *.o app
```

Figure 3: Makefile to compile the sample program outlined in 2.