0.1 Numerical Libraries vs Low Level Kernels

When research began on this project, GPU computing was still in a stage that could be considered fresh. Porting our problem to the GPU, we faced the same challenge that most applications of the GPU face: can it be done better with an existing library or should we write low-level code. We argue that leveraging existing libraries is preferred when possible. There is no need to reproduce what already exists except in the cases where we seek to improve performance.

Having chosen to leverage numerical libraries where possible, we make attempts to generalize the problem of RBF-FD on Multiple GPUs in terms of simple existing primitives. As Figure **??** illustrates, the bulk of computation can be reduced to simple sparse matrix-vector operations, with vector updates and a few vector reduce steps. From this perspective, then, RBF-FD is incredibly simple to code.

0.2 ViennaCL

The ViennaCL library was chosen to
is leveraged for its sparse matrix and dense vector representations on the GPU, as well as its efficient