



Parallel Vector & Signal Processing

CodeSourcery, LLC
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Overview

VSIPL++ is a C++ library for:

- Vector processing
- Signal processing

Applications:

- Missile systems
- Radar arrays

Objectives

- Performance
 - Proven techniques from POOMA
- Parallelism
 - SPMD
- Portability
 - Standard ISO C++, MPI
- Rapid Development
 - High-level abstractions

Development Plan

- Specification Development
 - Substantially complete
- Reference Implementation
 - Serial implementation at proof-of-concept stage
 - Parallel implementation in FY 2003
- Optimized Vendor Implementations
 - Not yet underway

Background: VSIPL

- C library for vector and signal-processing applications
- Multiple vendor implementations

VSIPL++ Additions:

- Parallelism
- Simpler syntax
- Extensibility

BLAS zherk Routine

zherk performs a rank-k update of
Hermitian matrix C:

$$C \leftarrow \alpha * A * \text{conjug}(A)^t + \beta * C$$

```
Matrix<complex<double> > A(10,15);  
Matrix<complex<double> > C(10,10);  
C = alpha * prodh(A,A) + beta * C;  
// Matrices and data automatically destroyed.
```

Development Benefits

- Automatic parallelism
 - No explicit MPI calls
- Code uses mathematical notation
- Automatic memory allocation
- Fewer opportunities for error.
- Reduced development costs
- Reduced development time

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