Hint for Matrix-Matrix Multiplication

Due March 10, 2011

In the second variant for implementing the matrix-matrix multiply you will want to perform the operation $c_1^T = \alpha a_1^T B + c_1^T$. Now, you will wonder: I don’t have a routine for this.

The fact is that you do:

\[ c_1^T = \alpha a_1^T B + c_1^T \]
is the same as

\[ (c_1^T)^T = (\alpha a_1^T B + c_1^T)^T \]
so that

\[ c_1 = \alpha B^T a_1 + c_1 \]

which is just a special case of matrix-vector multiplication.

Here is what I suggest:

- First, implement your matrix-matrix multiplication with the loop-body command

\[ c_1^T = \alpha a_1^T B + c_1^T \]

by the command

\[ \texttt{cit = alpha * a1t B + cit; } \]

and get it to work.

- Second, implement your matrix-matrix multiplication by implementing

\[ c_1^T = \alpha a_1^T B + c_1^T \]

by the command

\[ \texttt{cit = SLAP_Gemv( SLAP_TRANSPOSE, alpha, B, a1t, 1, cit ); } \]

If you implemented this routine correctly (meaning that you made it so that \texttt{SLAP_Gemv( SLAP_TRANSPOSE, alpha, A, x, beta, y )} works for \texttt{x} and \texttt{y} begin row or column vectors) then this should work. Otherwise, you may have to go back and fix \texttt{SLAP_Gemv}!