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- 5.3.4 Matrix-Matrix Multiplication with Rank-1 Updates
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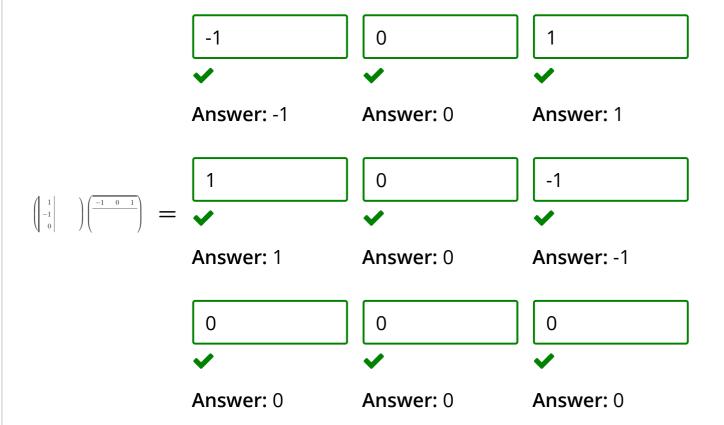
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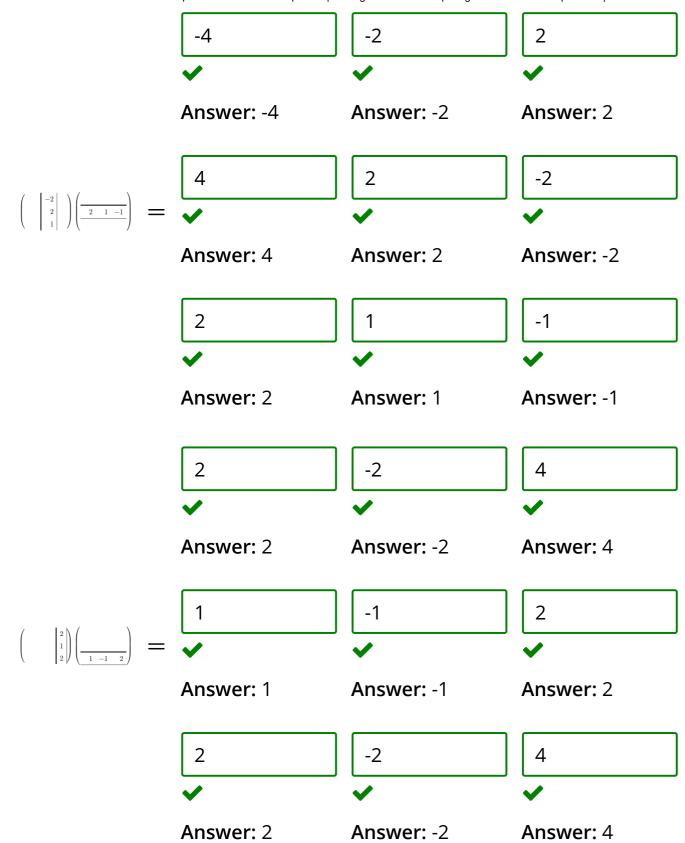
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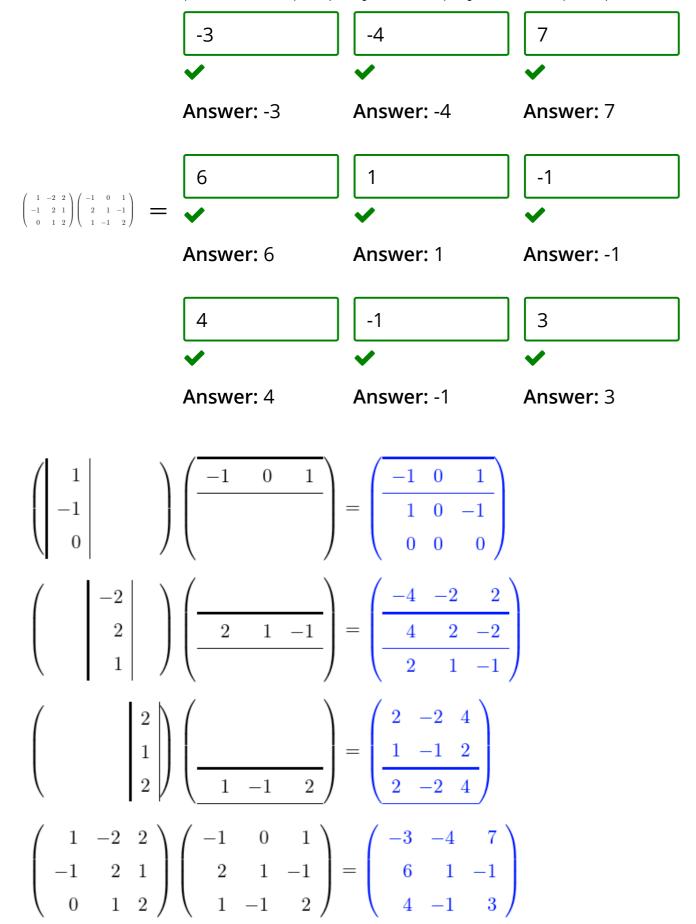
Homework 5.3.4.1

36/36 points (graded)

Compute each of the following matrix-matrix multiplications:







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Answers are displayed within the problem

Homework 5.3.4.2

1 point possible (graded)

Algorithm: $C := \text{GEMM_UNB_VAR3}(A, B, C)$

Partition
$$A \to \left(\begin{array}{c|c} A_L & A_R \end{array} \right)$$
, $B \to \left(\begin{array}{c|c} B_T \\ \hline B_B \end{array} \right)$

where A_L has 0 columns, B_T has 0 rows

while
$$n(A_L) < n(A)$$
 do

Repartition

$$\left(\begin{array}{c|c} A_L & A_R \end{array}\right) \rightarrow \left(\begin{array}{c|c} A_0 & a_1 & A_2 \end{array}\right) , \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline B_1^T \\ \hline B_2 \end{array}\right)$$

where a_1 has 1 column, b_1 has 1 row

$$C := a_1 b_1^T + C$$

Continue with

$$\left(\begin{array}{c|c} A_L & A_R \end{array}\right) \leftarrow \left(\begin{array}{c|c} A_0 & a_1 & A_2 \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ \hline B_1 \\ \hline B_2 \end{array}\right)$$

endwhile

Write the routine

• [C_out] = Gemm_unb_var3(A, B, C)

that computes C := AB + C using the above algorithm.

Some links that will come in handy:

- <u>Spark</u> (alternatively, open the file LAFF-2.0xM -> Spark -> index.html)
- <u>PictureFLAME</u> (alternatively, open the file LAFF-2.0xM -> PictureFLAME -> PictureFLAME.html)

The update $C := a_1 b_1^T + C$ can be accomplished by the call to

```
laff_ger( ... )
```

(click on the "laff routines" tab at the top of the page for more info).

You may want to use the following script to test your implementations:

• test Gemm unb var3.m



Gemm unb var3.m

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1 Answers are displayed within the problem

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