

Diagram illustrating the decomposition of a matrix $X^{(1,2)}$ into a product of matrices U_{12} , B_{1234}^T , and U_{34}^T .

The matrix $X^{(1,2)}$ has dimensions $n_1 n_2$ (vertical) and $n_3 n_4$ (horizontal). It is equal to the product of three matrices:

- U_{12} with dimensions $n_1 n_2$ (vertical) and k_{12} (horizontal).
- B_{1234}^T with dimensions k_{12} (vertical) and k_{34} (horizontal).
- U_{34}^T with dimensions k_{34} (vertical) and $n_3 n_4$ (horizontal).

Diagram illustrating the decomposition of a matrix U_{12} into a product of matrices U_1 , B_{12} , and U_2^T .

The matrix U_{12} has dimensions $n_1 n_2$ (vertical) and k_{12} (horizontal). It is equal to the product of three matrices:

- U_1 with dimensions n_1 (vertical) and k_1 (horizontal).
- B_{12} with dimensions k_1 (vertical) and k_2 (horizontal).
- U_2^T with dimensions k_2 (vertical) and n_2 (horizontal).