

The diagram illustrates the derivation of the 6x6 matrix M from the 5x5 matrix A . The process involves several steps of row and column operations, each represented by a matrix equation with arrows indicating the transformation.

Step 1: The 5x5 matrix A is transformed into a 5x6 matrix B by adding the first row to the second, third, fourth, and fifth rows. This is represented by the equation:

$$\begin{pmatrix} 1.957775e+09 & 1.7e+09 & 1.8e+09 & 7.2e+08 & 6e+08 & 1e+09 \\ 1.4e+09 & 2e+09 & 7.8e+08 & 3e+08 & 3.5e+07 & 2.9e+08 \\ 2.1e+09 & 2.8e+08 & 3.4e+08 & 1.1e+09 & 1.3e+09 & 1.4e+09 \\ 1.1e+09 & 6.3e+08 & 1.1e+09 & 8.6e+08 & 6.1e+08 & 1.7e+09 \\ 4.1e+08 & 1.1e+09 & 1.5e+08 & 1.9e+09 & 1.4e+08 & 9.8e+08 \end{pmatrix} \div 2e+09 \sim \begin{pmatrix} 1 & 0.86 & 0.92 & 0.37 & 0.3 & 0.52 \\ 1.4e+09 & 2e+09 & 7.8e+08 & 3e+08 & 3.5e+07 & 2.9e+08 \\ 2.1e+09 & 2.8e+08 & 3.4e+08 & 1.1e+09 & 1.3e+09 & 1.4e+09 \\ 1.1e+09 & 6.3e+08 & 1.1e+09 & 8.6e+08 & 6.1e+08 & 1.7e+09 \\ 4.1e+08 & 1.1e+09 & 1.5e+08 & 1.9e+09 & 1.4e+08 & 9.8e+08 \end{pmatrix} \xrightarrow{-(1.4e+09)} \begin{pmatrix} 1 & 0.86 & 0.92 & 0.37 & 0.3 & 0.52 \\ 0 & 8.7e+08 & -4.7e+08 & -2e+08 & -3.8e+08 & -4.2e+08 \\ 2.1e+09 & 2.8e+08 & 3.4e+08 & 1.1e+09 & 1.3e+09 & 1.4e+09 \\ 1.1e+09 & 6.3e+08 & 1.1e+09 & 8.6e+08 & 6.1e+08 & 1.7e+09 \\ 4.1e+08 & 1.1e+09 & 1.5e+08 & 1.9e+09 & 1.4e+08 & 9.8e+08 \end{pmatrix} \xrightarrow{-(2.1e+09)} \begin{pmatrix} 1 & 0.86 & 0.92 & 0.37 & 0.3 & 0.52 \\ 0 & 8.7e+08 & -4.7e+08 & -2e+08 & -3.8e+08 & -4.2e+08 \\ 0 & -1.6e+09 & -1.6e+09 & 3.1e+08 & 6.6e+08 & 2.5e+08 \\ 1.1e+09 & 6.3e+08 & 1.1e+09 & 8.6e+08 & 6.1e+08 & 1.7e+09 \\ 4.1e+08 & 1.1e+09 & 1.5e+08 & 1.9e+09 & 1.4e+08 & 9.8e+08 \end{pmatrix} \xrightarrow{-(1.1e+09)} \begin{pmatrix} 1 & 0.86 & 0.92 & 0.37 & 0.3 & 0.52 \\ 0 & 8.7e+08 & -4.7e+08 & -2e+08 & -3.8e+08 & -4.2e+08 \\ 0 & -1.6e+09 & -1.6e+09 & 3.1e+08 & 6.6e+08 & 2.5e+08 \\ 0 & -3.4e+08 & 1.7e+07 & 4.4e+08 & 2.6e+08 & 1.1e+09 \\ 4.1e+08 & 1.1e+09 & 1.5e+08 & 1.9e+09 & 1.4e+08 & 9.8e+08 \end{pmatrix} \xrightarrow{-(4.1e+08)} \begin{pmatrix} 1 & 0.86 & 0.92 & 0.37 & 0.3 & 0.52 \\ 0 & 8.7e+08 & -4.7e+08 & -2e+08 & -3.8e+08 & -4.2e+08 \\ 0 & -1.6e+09 & -1.6e+09 & 3.1e+08 & 6.6e+08 & 2.5e+08 \\ 0 & -3.4e+08 & 1.7e+07 & 4.4e+08 & 2.6e+08 & 1.1e+09 \\ 0 & 7.7e+08 & -2.3e+08 & 1.8e+09 & 1.2e+07 & 7.7e+08 \end{pmatrix} \div 8.7e+08 \sim \begin{pmatrix} 1 & 0.86 & 0.92 & 0.37 & 0.3 & 0.52 \\ 0 & 1 & -0.54 & -0.23 & -0.44 & -0.48 \\ 0 & 0 & -2.5e+09 & -4.2e+07 & -2.1e+07 & -5.1e+08 \\ 0 & 0 & -1.7e+08 & 3.7e+08 & 1.1e+08 & 9.8e+08 \\ 0 & 7.7e+08 & -2.3e+08 & 1.8e+09 & 1.2e+07 & 7.7e+08 \end{pmatrix} \xrightarrow{-(7.7e+08)} \begin{pmatrix} 1 & 0.86 & 0.92 & 0.37 & 0.3 & 0.52 \\ 0 & 1 & -0.54 & -0.23 & -0.44 & -0.48 \\ 0 & 0 & -2.5e+09 & -4.2e+07 & -2.1e+07 & -5.1e+08 \\ 0 & 0 & -1.7e+08 & 3.7e+08 & 1.1e+08 & 9.8e+08 \\ 0 & 7.7e+08 & -2.3e+08 & 1.8e+09 & 1.2e+07 & 7.7e+08 \end{pmatrix} \xrightarrow{-(1.9e+08)} \begin{pmatrix} 1 & 0.86 & 0.92 & 0.37 & 0.3 & 0.52 \\ 0 & 1 & -0.54 & -0.23 & -0.44 & -0.48 \\ 0 & 0 & 1 & 0.017 & 0.0085 & 0.2 \\ 0 & 0 & 0 & 3.7e+08 & 1.2e+08 & 1e+09 \\ 0 & 0 & 0 & 1.9e+09 & 3.5e+08 & 1.1e+09 \end{pmatrix} \div -2.5e+09 \sim \begin{pmatrix} 1 & 0.86 & 0.92 & 0.37 & 0.3 & 0.52 \\ 0 & 1 & -0.54 & -0.23 & -0.44 & -0.48 \\ 0 & 0 & 1 & 0.017 & 0.0085 & 0.2 \\ 0 & 0 & 0 & 1 & 0.017 & 0.0085 \\ 0 & 0 & 0 & 1.9e+09 & 3.5e+08 & 1.1e+09 \end{pmatrix} \xrightarrow{-(1.7e+08)} \begin{pmatrix} 1 & 0.86 & 0.92 & 0.37 & 0.3 & 0.52 \\ 0 & 1 & -0.54 & -0.23 & -0.44 & -0.48 \\ 0 & 0 & 1 & 0.017 & 0.0085 & 0.2 \\ 0 & 0 & 0 & 1 & 0.017 & 0.0085 \\ 0 & 0 & 0 & 1.9e+09 & 3.5e+08 & 1.1e+09 \end{pmatrix} \xrightarrow{-(1.9e+09)} \begin{pmatrix} 1 & 0.86 & 0.92 & 0.37 & 0.3 & 0.52 \\ 0 & 1 & -0.54 & -0.23 & -0.44 & -0.48 \\ 0 & 0 & 1 & 0.017 & 0.0085 & 0.2 \\ 0 & 0 & 0 & 1 & 0.31 & 2.7 \\ 0 & 0 & 0 & 0 & 1.9e+09 & 3.5e+08 \end{pmatrix} \div -2.6e+08 \sim \begin{pmatrix} 1 & 0.86 & 0.92 & 0.37 & 0.3 & 0.52 \\ 0 & 1 & -0.54 & -0.23 & -0.44 & -0.48 \\ 0 & 0 & 1 & 0.017 & 0.0085 & 0.2 \\ 0 & 0 & 0 & 1 & 0.31 & 2.7 \\ 0 & 0 & 0 & 0 & -2.6e+08 & -4.2e+09 \end{pmatrix} \div -2.6e+08 \sim \begin{pmatrix} 1 & 0.86 & 0.92 & 0.37 & 0.3 & 0.52 \\ 0 & 1 & -0.54 & -0.23 & -0.44 & -0.48 \\ 0 & 0 & 1 & 0.017 & 0.0085 & 0.2 \\ 0 & 0 & 0 & 1 & 0.31 & 2.7 \\ 0 & 0 & 0 & 0 & -2.6e+08 & -4.2e+09 \end{pmatrix} \div -2.6e+08 \sim \begin{pmatrix} 1 & 0.86 & 0.92 & 0.37 & 0.3 & 0.52 \\ 0 & 1 & -0.54 & -0.23 & -0.44 & -0.48 \\ 0 & 0 & 1 & 0.01$$