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Master Structural Mechanics and Coupled Systems

# Applied Mathematics

## Student presentation 2 (course 07)

- Square root of a positive definite matrix

Let $n \geq 1$ an integer and $A$ a real symmetric positive definite matrix of order $n$.

a) Recall the principal properties relative to such a matrix.

b) Construct a real symmetric positive definite matrix $S$ such that $S.S = A$.

c) Why the denomination of "square root" of the matrix $A$ is appropriate ?

d) Evaluate the matrix $S$ when $A = \begin{pmatrix} 2 & -1 \\ -1 & 2 \end{pmatrix}$.

e) Show that there exists other matrices $S'$ such that $S'.S' = A$.

François Dubois, september 2023.