

tensormatrix – version v1.0.1

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This package helps visualizing the structure of matrices representing the tensors of linear constitutive equations. It requires the tikz package. The package provides an environment *tmat* which takes two parameters, the dimensions of the matrix. The environment requires math mode. Inside the environment a sequence of commands can be given. The available commands are listed in table 1. They either define a symbol to appear at the location specified by the parameter of the command or a link between two elements. If no symbol is defined for an element, the default, a small dot, is shown. This would define a zero value in the usual use of the notation.

Table 1: Elements available, notation and usual interpretation

Symbol	Command	Interpretation
.		a component that is zero
•	<code>\tmatpv{M}{N}</code>	element (M,N) that is nonzero
◦	<code>\tmatpn{M}{N}</code>	element (M,N) has sign opposite to the one it is connected to
⊙	<code>\tmatpdv{M}{N}</code>	element (M,N) has twice the value of the solid-circle component it is connected to
⊖	<code>\tmatpdn{M}{N}</code>	element (M,N) has minus twice the value of the solid-circle component it is connected to
×	<code>\tmatpx{M}{N}</code>	element (M,N) is given by other elements
↖	<code>\tmatlink{M N}{P Q}</code>	connection between elements (M,N) and (P,Q) with related values

Examples of typical use are provided by the matrices given in figure 1.

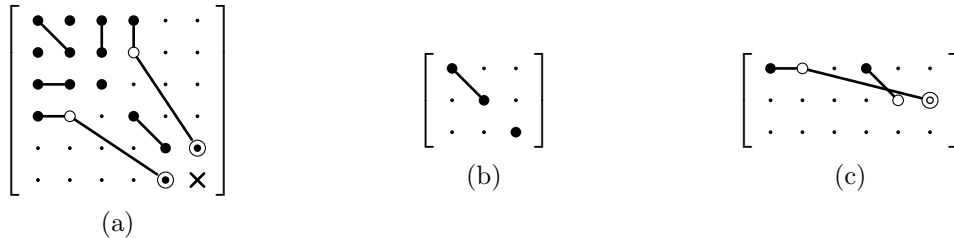


Figure 1: Matrices for a material of with class-32 symmetry. (a) S^E , S^D . (b) κ^ϵ , κ^σ , β^ϵ , β^σ . (c) d .

As an example of use, the code producing the matrix in figure 1a is:

```
\begin{tmat}{6}{6}
  \tmatpv{1}{1}
  \tmatpv{1}{2}
  \tmatpv{1}{3}
  \tmatpv{1}{4}
  \tmatpv{2}{1}
  \tmatpv{2}{2}
  \tmatpv{2}{3}
  \tmatpn{2}{4}
  \tmatpv{3}{1}
  \tmatpv{3}{2}
  \tmatpv{3}{3}
  \tmatpv{4}{1}
  \tmatpn{4}{2}
  \tmatpv{4}{4}
  \tmatpv{5}{5}
  \tmatpx{6}{6}
  \tmatpdv{6}{5}
  \tmatpdv{5}{6}
  \tmatlink{1 1}{2 2}
  \tmatlink{1 3}{2 3}
  \tmatlink{1 4}{2 4}
  \tmatlink{2 4}{5 6}
  \tmatlink{3 1}{3 2}
  \tmatlink{4 1}{4 2}
  \tmatlink{4 2}{6 5}
  \tmatlink{4 4}{5 5}
\end{tmat}
```