

ELATE: Elastic tensor analysis

Welcome to ELATE, the online tool for analysis of elastic tensors, developed by **Romain Gaillac** and **François-Xavier Coudert** at [CNRS / Chimie ParisTech](https://www.cnrs.fr/).

If you use the software in published results (paper, conference, etc.), please cite the [corresponding paper](#) (*J. Phys. Condens. Matter*, 2016, 28, 275201) and give the website URL.

ELATE is [open source software](#). Any queries or comments are welcome at fx.coudert@chimie-paristech.fr

Summary of the properties (3D material)



Input: stiffness matrix (coefficients in GPa) of

49.089	24.2	15.792	-0.0121	-0.0207	6.9446
24.2	21.049	9.9717	0.1428	0.3205	2.7049
15.792	9.9717	279.05	1.1616	0.031	3.2918
-0.0121	0.1428	1.1616	1.0992	0.8919	0.2544
-0.0207	0.3205	0.031	0.8919	3.756	-0.1076
6.9446	2.7049	3.2918	0.2544	-0.1076	5.7735

Average properties

Averaging scheme	Bulk modulus	Young's modulus	Shear modulus	Poisson's ratio
Voigt	$K_V = 49.902$ GPa	$E_V = 57.712$ GPa	$G_V = 22.074$ GPa	$\nu_V = 0.30725$
Reuss	$K_R = 19.199$ GPa	$E_R = 7.1586$ GPa	$G_R = 2.4893$ GPa	$\nu_R = 0.43786$
Hill	$K_H = 34.55$ GPa	$E_H = 32.942$ GPa	$G_H = 12.282$ GPa	$\nu_H = 0.34109$

Eigenvalues of the stiffness matrix

λ_1	λ_2	λ_3	λ_4	λ_5	λ_6
0.80348 GPa	3.9871 GPa	4.4102 GPa	7.5851 GPa	62.318 GPa	280.71 GPa

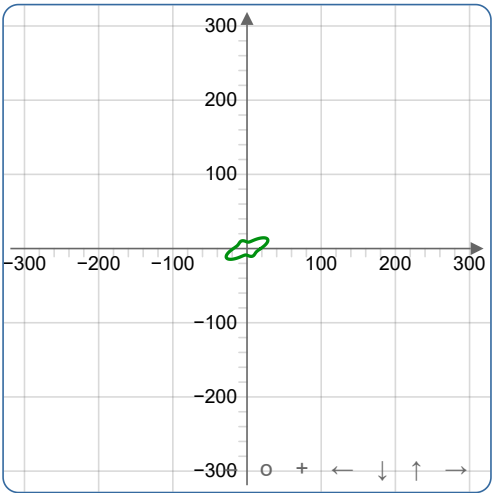
Variations of the elastic moduli

	Young's modulus		Linear compressibility		Shear modulus		Poisson's ratio		
	E_{\min}	E_{\max}	β_{\min}	β_{\max}	G_{\min}	G_{\max}	ν_{\min}	ν_{\max}	
Value	2.9356 GPa	273.14 GPa	-6.4246 TPa ⁻¹	55.605 TPa ⁻¹	0.80311 GPa	26.109 GPa	-0.26389	1.1429	Value
Anisotropy	93.04		∞		32.51		∞		Anisotropy
Axis	-0.2511	-0.0000	0.9417	-0.1839	-0.0763	0.6417	0.7771	0.2040	Axis
	0.6955	0.0039	0.1731	0.9829	-0.0170	0.2864	0.5952	0.1885	
	0.6732	1.0000	0.2886	0.0104	0.9969	-0.7115	-0.2046	0.9607	

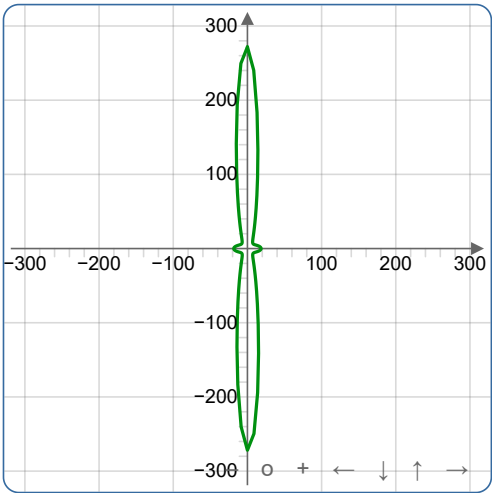
-0.2893	-0.6545	-0.5025	0.3977	Second axis
0.9572	-0.2790	0.3910	0.8807	
-0.0058	-0.7027	-0.7711	-0.2572	

Spatial dependence of Young's modulus

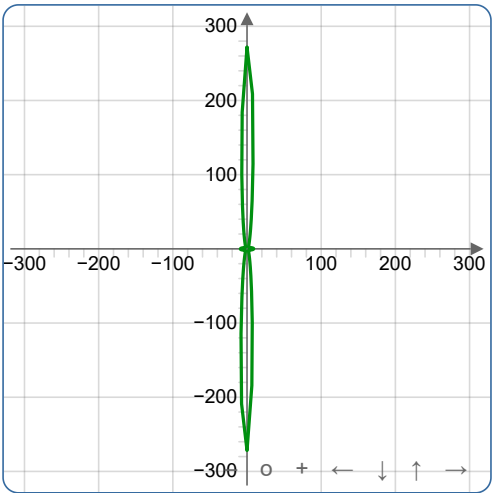
Visualize in 3D



Young's modulus in (xy) plane



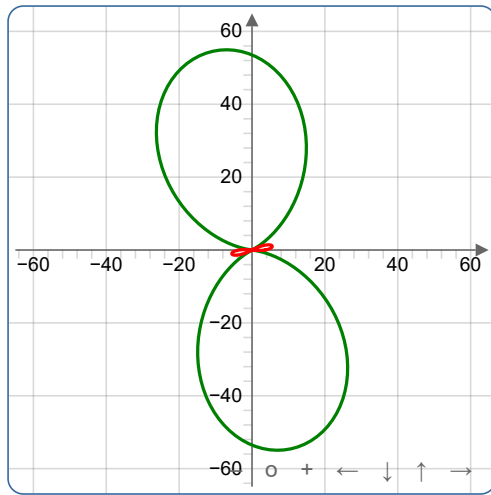
Young's modulus in (xz) plane



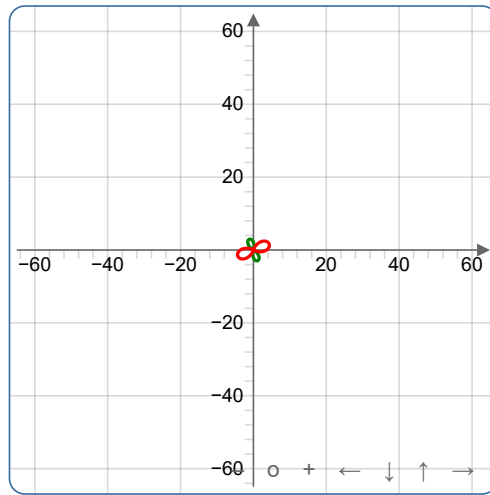
Young's modulus in (yz) plane

Spatial dependence of linear compressibility

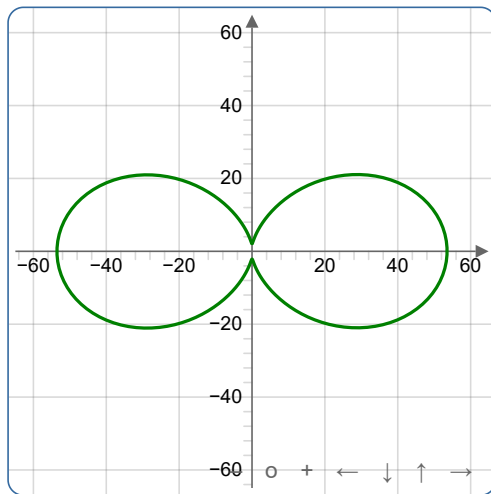
Visualize in 3D



linear compressibility in (xy) plane



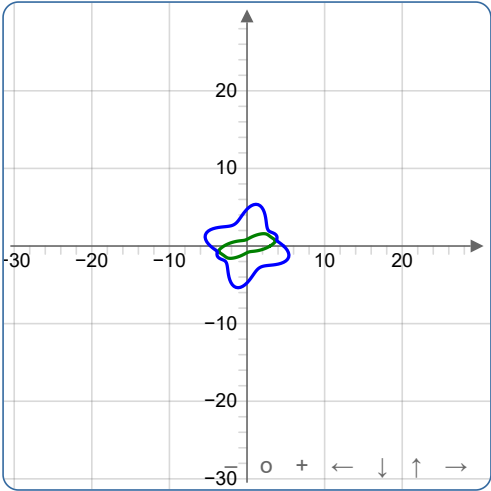
linear compressibility in (xz) plane



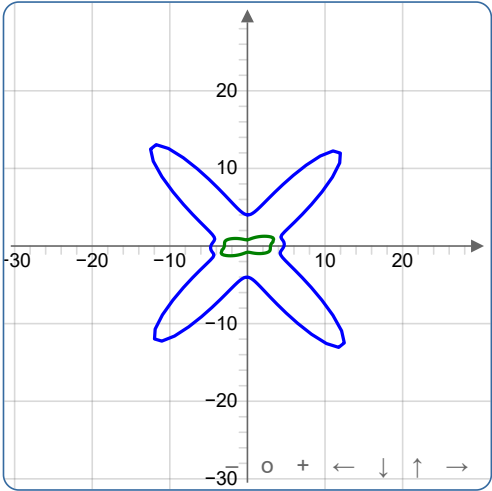
linear compressibility in (yz) plane

Spatial dependence of shear modulus

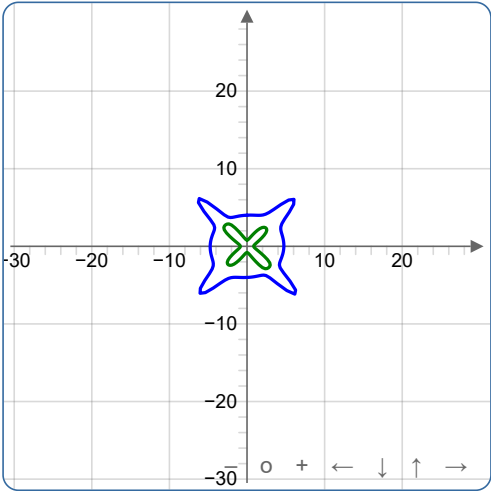
[Visualize in 3D](#)



Shear modulus in (xy) plane



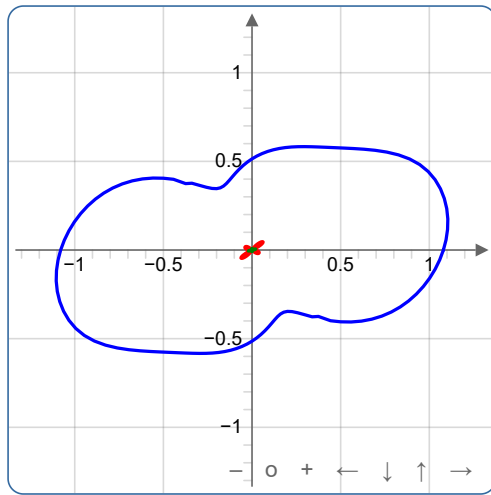
Shear modulus in (xz) plane



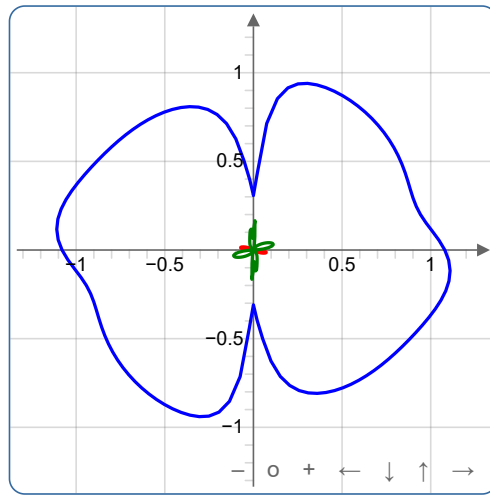
Shear modulus in (yz) plane

Spatial dependence of Poisson's ratio

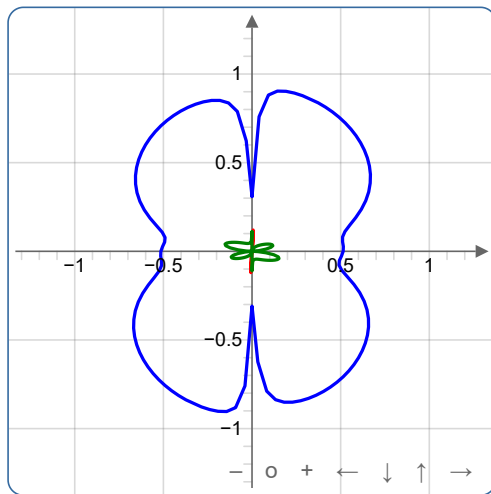
Visualize in 3D



Poisson's ratio in (xy) plane



Poisson's ratio in (xz) plane



Poisson's ratio in (yz) plane

Code version: 2024.03.15 (running on Python 3.11.2)
Execution time: 1.180 seconds