

What is a scalar and examples?

scalar, a physical quantity that is completely described by its magnitude. Examples of scalars are volume, density, speed, energy, mass, and time. Other quantities, such as force and velocity, have both magnitude and direction and are called vectors. Related Topics: mathematics scalar multiplication quantity.

What is an example of a vector in English?

John walks north 20 meters. The direction "north" together with the distance "20 meters" is a vector. An apple falls down at 10 meters per second. The direction "down" combined with the speed "10 meters per second" is a vector.

What do you mean by matrix?

matrix, a set of numbers arranged in rows and columns so as to form a rectangular array. The numbers are called the elements, or entries, of the matrix. Matrices have wide applications in engineering, physics, economics, and statistics as well as in various branches of mathematics.

What is a tensor example?

A **tensor** is a multi-dimensional array of numerical values that can be used to describe the physical state or properties of a material. A simple example of a geophysically relevant tensor is stress. Stress, like pressure is defined as force per unit area.

How to calculate surface force?**Steps for Calculating the Normal Force on a Level Surface**

1. Step 1: Draw a free-body diagram indicating all of the forces acting on the object.
2. Step 2: Add all of the upward forces together and subtract all of the downward forces from this sum. ...
3. Step 3: Solve the sum of forces equation for the normal force.

What are the principal stresses?

Principal stress represents the maximum and minimum normal stresses that occur within a material when subjected to complex loading conditions. It is essential to understand this concept as it provides insights into the material's response and its potential points of weakness.

What is small deformations?

The small-deformation theory (or, equivalently, the small-strain or infinitesimal theory) is customarily obtained by assuming that the displacements u are small, and expanding u in a power series with respect to a small parameter.

What are the three types of deformation?

The three types of deformation are **elastic, ductile, and brittle**. Rocks experiencing elastic deformation return to their original shape and size, those experiencing ductile deformation do not return to their original shape, and brittle deformation results in rocks being broken apart, causing a loss of coherence.

What is Hooke's Law and explain?

Hooke's law states that the strain of the material is proportional to the applied stress within the elastic limit of that material. When the elastic materials are stretched, the atoms and molecules deform until stress is applied, and when the stress is removed, they return to their initial state.

Why use Hooke's Law?

To describe the relationship between an object's elastic potential and the level of force required to enact this potential. Hooke's law also governs the limits of an object's elasticity, a metal spring, for instance, can only stretch so far before excess force causes it to break.

What is maximum principal stress at failure?

The maximum stress criterion (principal stress or Rankine criterion) states that failure occurs at a point in brittle material when a principal stress (σ_I or σ_{II}) reaches either the uniaxial tension strength $\sigma_t > 0$, or the uniaxial compression strength $\sigma_c < 0$.

What is the maximum principal stress von Mises?

Maximum principal stresses are the components of stresses when the basis of other stress tensors are zero and define the stress concentrated in a specific region. **Von Mises** stress, on the other hand, is a scalar quantity obtained from the stresses acting on any structure.

What is the maximum shear stress of Tresca?

The **Tresca** yield condition proposes that the primary factor for yielding is the maximum shear stress in the material. The criterion then stipulates that the maximum shear stress must be equal to a constant material value of k during plastic flow.