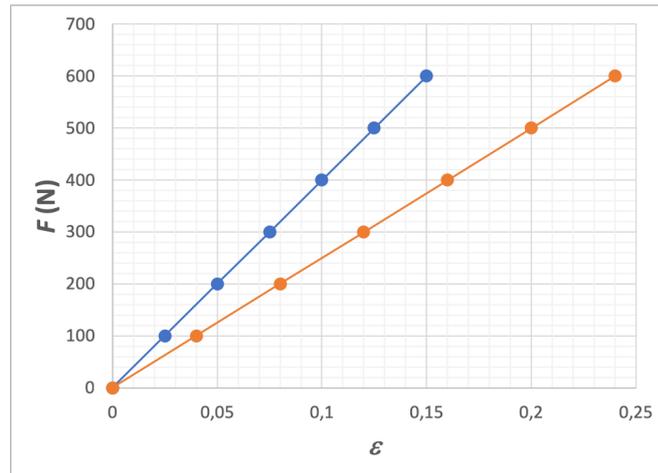
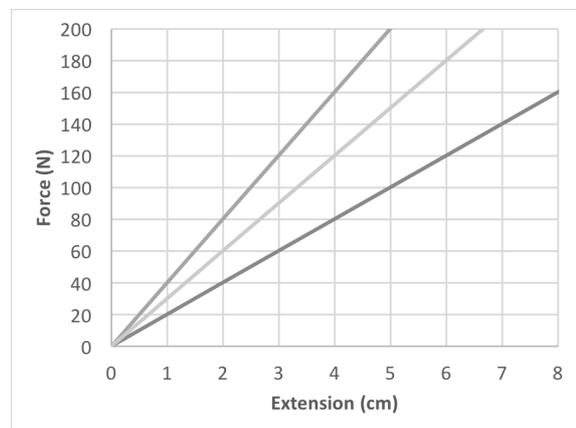


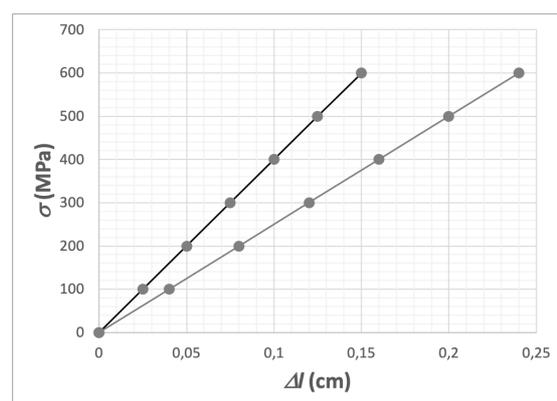
1. The graph shows the stretch diagram of two metal threads. The Young's modulus of the metal is $E=0.5 \text{ GPa}$ and the threads are cylindrical. Calculate the diameter of the threads!



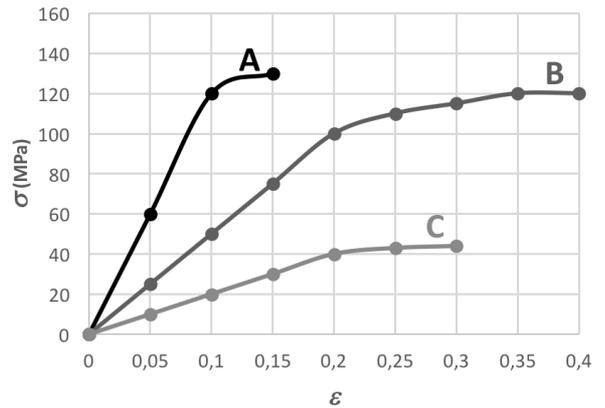
2. The graph shows the stretch diagram of three different metal threads. Each thread is cylindrical, 25 cm long and has a diameter of 1.75 mm. Calculate the Young's modulus of the one with the lowest stiffness!



3. The graph shows the stretch diagram of two metal threads. The Young's modulus of the metal is $E = 400 \text{ MPa}$ and the threads are cylindrical with a radius of 1mm. Calculate the length of the threads!



4. The graph shows the stretch diagram of three different metal threads until fracture.



a) Arrange the three metals in order of increasing **toughness**!

b) Calculate the **resilience** of the toughest metal!

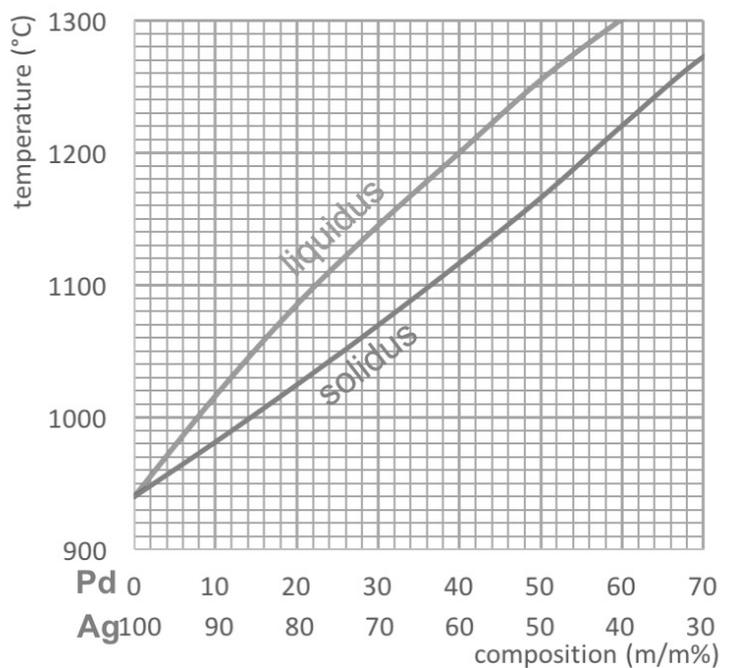
c) Read the tensile strength of three materials from the graph!

5. The figure shows the phase diagram of Ag-Pd alloy. Answer the questions!

a) What is the melting point of silver? (2p)

b) A 40% Pd — 60% Ag melted alloy (m/m) is cooled from 1300 °C. At which temperature will the first solid grains appear? (2p)

c) A 40% Pd — 60% Ag melted alloy (m/m) is cooled from 1300 °C. Determine the mass % of Pd in the solid grains that appear first! (3p)

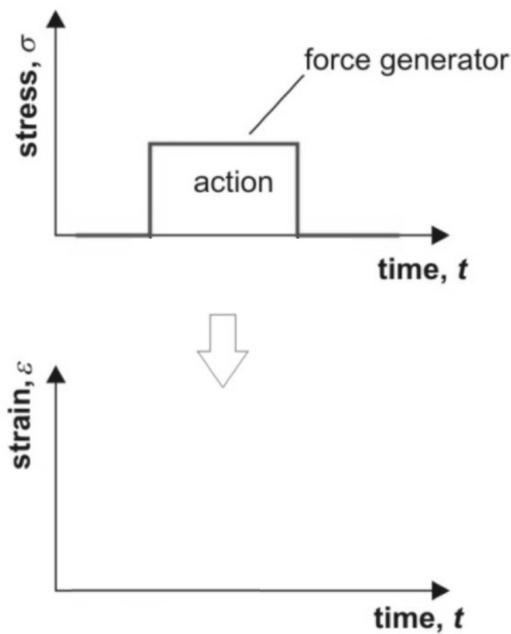


d) A 30% Pd — 70% Ag alloy has a temperature of 1100 °C. Determine how many percent of the total mass is in liquid and in solid phases! (3p)

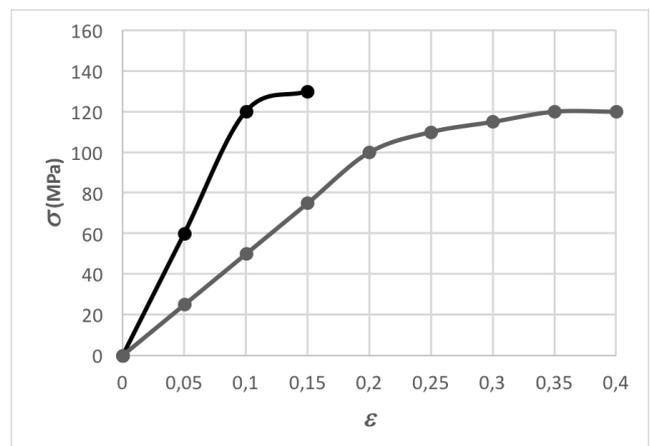
6. a) Draw a typical stress-strain curve of a **metal** and name its regions! (10p) Indicate the elastic limit (σ_e) and elastic strain recovery (ϵ_r) on the graph!

b) Draw a typical stress-strain curve of a **brittle** material! Indicate the **strength** (σ_s) on the graph

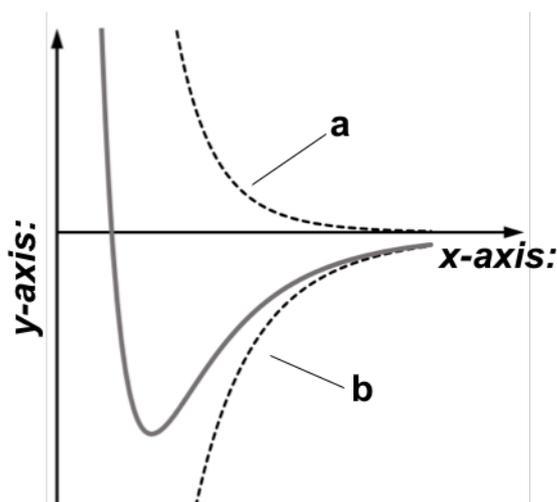
7. Draw the strain-time diagram of the Kelvin-Voight model according to the stress time diagram!



8. The graph shows the stretch diagram of two different metal threads until fracture. Calculate the resilience of the tougher metal!



9. The graph describes an interaction between two atoms.



a) Label the axes!

b) What do the dashed line represent?

a:

b:

c) On the graph indicate binding energy

d) On the graph indicate binding distance

10. The graph shows the stretch diagram of three different elastic threads. The resting length of each thread is 0.4 m, their cross-sectional area is 20 mm^2 . Calculate the Young's modulus of the stiffest metal!

