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# Response functions

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- Use the result from the previous question to show, by expanding  $\delta E$  using the Taylor series, that  $\left(\frac{\delta^2 E}{\delta S^2}\right)_V > 0$  and  $\left(\frac{\delta^2 E}{\delta V^2}\right)_S > 0$ .
- Hence, show that  $C_v$  must be greater than zero
- Give the definition of the isentropic compressibility,  $\kappa_s$ .
- Show that  $\kappa_s = -\frac{1}{V} \left(\frac{\partial V}{\partial P}\right)_S$



**MathsNET**

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teaching and learning  
mathematics

# Response functions

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- Explain why the isentropic compressibility must be positive