

fluctuation is represented by the LINE connecting the left and right composition point.

- At point I) (binodal case) the average G of the locally heterogeneous system (red points and red line) is higher than G of the homogeneous phase with fluctuation. Thus the initial phase is at least in the average more stable than the demixed system. Thus the initial phase is metastable. So $\partial G^2 / \partial x_B^2 > 0$ implies metastable states against fluctuation inside the homogeneous phase.
- At point II) (spinodal case) the average G of the locally heterogeneous system is lower than G of the homogeneous phase with fluctuation. Thus $\partial G^2 / \partial x_B^2 < 0$ implies unstable states against fluctuation inside the homogeneous phase.

In summary the curvature determines whether the average value due to compositional fluctuation is lower and higher than the one of the initial phase, respectively. Thus, the inflection point of the G -curve separates metastable and instable scenarios. Thus a further critical point exists if the third derivative is zero.