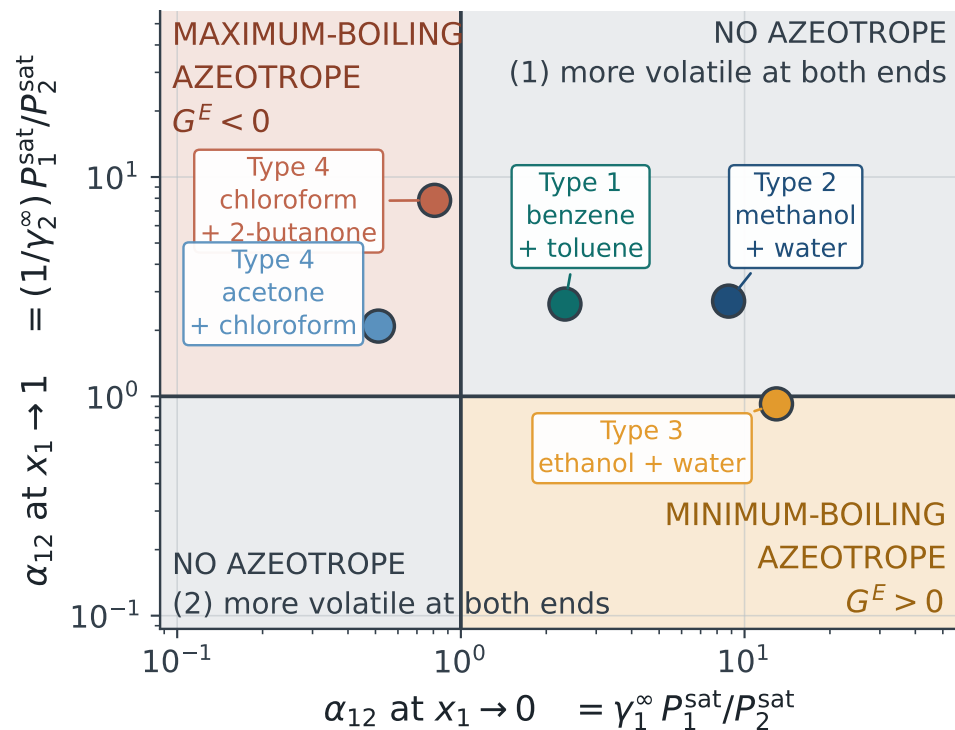
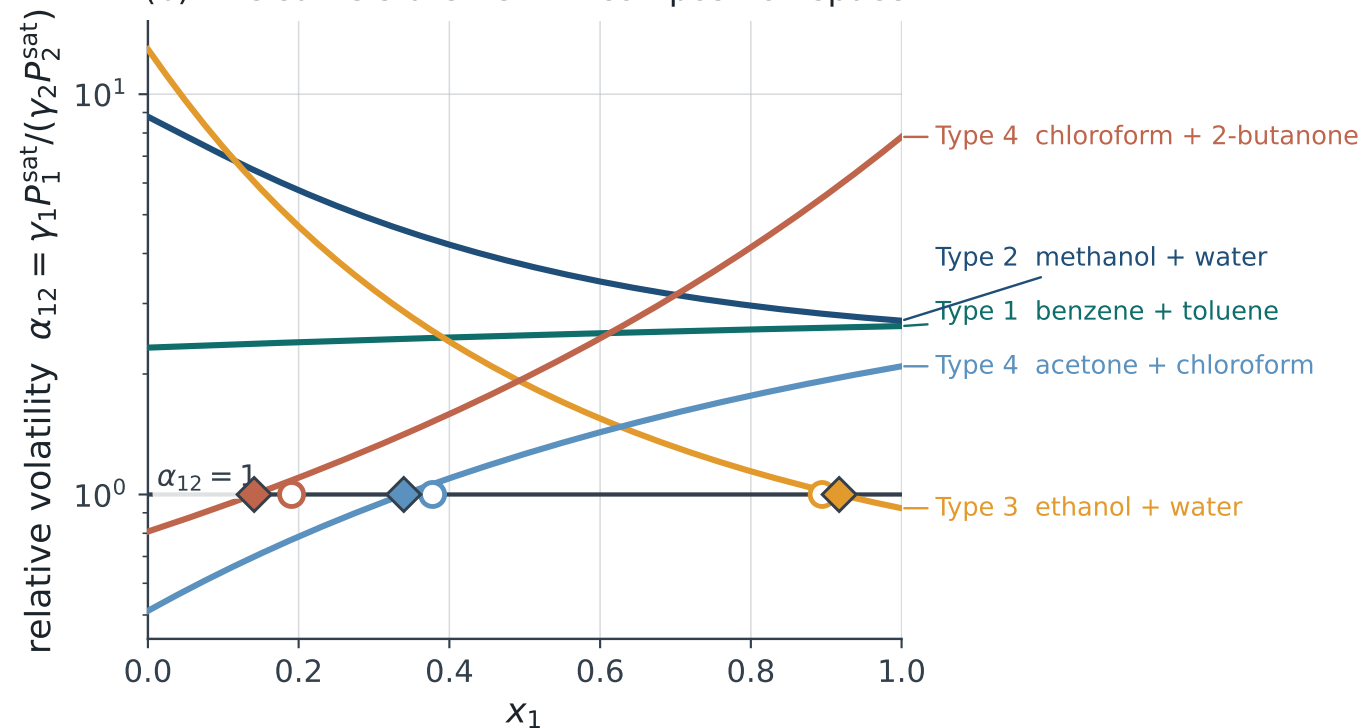


An azeotrope is a consequence, not a category: $\gamma_1/\gamma_2 = P_2^{\text{sat}}/P_1^{\text{sat}}$ either has a root in (0, 1) or it does not

(a) the criterion as a map: an azeotrope exists iff α_{12} straddles 1



(b) the same statement in composition space



filled diamond = azeotrope of the fitted NRTL; open circle = crossing of $y_1 = x_1$ read from the published table
ethanol + water: model 0.917 vs data 0.895; chloroform + 2-butanone: model 0.141 vs data 0.191; acetone + chloroform: model 0.339 vs data 0.378

γ_i^∞ from NRTL ($\alpha = 0.3$) fitted to each published set by Barker's method; P_i^{sat} from the Antoine constants in vlekkit.data.LIBRARY, evaluated at each end's own boiling temperature for the isobaric sets.
Straddling ends guarantee a root; non-straddling ends do not forbid one — a G^E with three or more parameters can make γ_1/γ_2 non-monotonic and place two azeotropes with both ends on the same side.