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Intersections of Qualitative Cluster Sets

§1.

Let H denote the open upper half plane above the real line R and let z and x denote points in H and R respectively. Let $\overline{A}$ denote the closure of the set A. For two directions θ_1 and θ_2, $0 < \theta_1 < \theta_2 < \pi$, we write

$$\sigma_{\theta_1\theta_2} = \{z: z \in H; \theta_1 < \arg z < \theta_2\}$$

Then $\sigma_{\theta_1\theta_2}$ is a sector in H with vertex at the origin. By $\sigma_{\theta_1\theta_2}(x)$ we denote the translate of $\sigma_{\theta_1\theta_2}$ which is obtained by taking the origin at x. If there is no confusion then we simply write σ and $\sigma(x)$ instead of $\sigma_{\theta_1\theta_2}$ and $\sigma_{\theta_1\theta_2}(x)$. For a fixed $x \in R$, fixed $\theta \in (0,\pi)$, and $r > 0$ we write

$$L_\theta(x) = \{z: z \in H; \arg (z-x) = \theta\},$$

$$K(x,r) = \{z: z \in H; |z - x| < r\},$$

$$\sigma(x,r) = \sigma(x) \cap K(x,r), \text{ and}$$

$$L_\theta(x,r) = L_\theta(x) \cap K(x,r) .$$