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Preimages of geometric paths and cycles

A graph H is a preimage of G, equivalently is G-colourable, if there exists a homomorphism $H \to G$. A geometric graph $\overline{G}$ consists of G and a straightline drawing, or geometric realization, of G; a geo-homomorphism $\overline{H} \to \overline{G}$ is a homomorphism $H \to G$ that preserves edge crossings. The homomorphism poset $\mathcal{G}$ is the set of geometric realizations of G ordered by geo-homomorphisms. Then $\overline{H}$ is $\mathcal{G}$-colourable if $\overline{H} \to \overline{G}$ for some $\overline{G} \in \mathcal{G}$. I characterize $\mathcal{C}_n$-colourable and $\mathcal{P}_n$-colourable geometric graphs for $n \leq 5$.