**Esercizio 1.** (Alessandro Martina) Let $\varphi(x,y) \in L$, where $|x| = |y| = 1$. Suppose there is an infinite set $A \subseteq \mathcal{U}$ such that $\varphi(a,b) \nleftrightarrow \varphi(b,a)$ for every two distinct $a,b \in A$. Prove that $\varphi(x\,;y)$ is unstable.

**Esercizio 2.** (Francesco Sulpizi) Find some unstable $p(x\,;z) \subseteq L(A)$ that admits no ladder of infinite length. Hint: work in a dense linear order, and consider the set of formulas of the form $x < y \ \vee\ y \notin \{a_0,\dots,a_n\}$.

**Esercizio 3.** (Leonardo Centazzo) Prove that

$$\bigcup\big\{\mathcal{M} \,:\, \mathcal{M} \text{ a minimal left ideal}\big\} \quad = \quad \bigcup\big\{\mathcal{M} \,:\, \mathcal{M} \text{ a minimal right ideal}\big\}.$$

**Esercizio 4.** (Roberto Carnevale) For every finite coloring of $\mathbb{N}$ and every $k < \omega$, there is an infinite sequence $\bar{a} = \langle a_i(x) : i < \omega\rangle$ of nonconstant univariate polynomials with coefficients in $\mathbb{N}$ such that $\big\{a(h) : a(x) \in \mathrm{fp}(\bar{a}),\ h < k\big\}$ is monochromatic. Can we require that the $a_i(x)$ have increasing degrees?

**Esercizio 5.** (Matteo Bisi) Let $\Sigma$ be a finite set of homomorphisms $\sigma : S \to C$ between infinite semigroups such that the following intersection is nonempty for all $c \in C$

$$\Sigma^{-1}[c] \quad = \quad \bigcap_{\sigma\in\Sigma} \sigma^{-1}[c]$$

where $\sigma^{-1}[c] = \{s \in S :\ \sigma(s) = c\}$. Prove that, for every finite coloring of $C$, there is some $g \in S \smallsetminus C$ such that the set $\{\sigma g \,:\, \sigma \in \Sigma\}$ is monochromatic.

**Esercizio 6.** (Davide Peccioli) The following claim is too strong to be true. For every finite coloring of $\mathbb{N}^{(2)}$ there is an infinite sequence $\bar{a} = \langle a_i \,:\, i < \omega\rangle$ in $\mathbb{N}$ such that $\mathrm{fp}(\bar{a})^{(2)}$ is monochromatic. Replace $\mathrm{fp}(\bar{a})^{(2)}$ with a (slightly) smaller set that makes the claim true.

**Esercizio 7.** (Pietro Giura) Let $\mathcal{M}$ and $\mathcal{N}$ be type-definable minimal left ideals of $\mathcal{C}$. Let $u \in \mathcal{M}$ and $v \in \mathcal{N}$ be idempotents. Prove that $u * \mathcal{M}$ and $v * \mathcal{N}$ are isomorphic groups.

**Esercizio 8.** (Costanza Furone) Let $\mathcal{M}$ be a type-definable minimal left ideal of $\mathcal{C}$. Let $u \in \mathcal{M}$ be an idempotent. Prove that $u * \mathcal{M}$ is a minimal right ideal of $\mathcal{C}$.

**Esercizio 9.** (Angela Dosio) For every finite coloring of $\mathbb{N}$ and every $k < \omega$, there is an infinite sequence $\bar{a} = \langle a_i(x) : i < \omega\rangle$ of nonconstant univariate polynomials with coefficients in $\mathbb{N}$ such that $\big\{a(h) : a(x) \in \mathrm{fp}(\bar{a}),\ h < k\big\}$ is monochromatic. Can we require that the $a_i(x)$ have increasing degrees?