1971

1971-1. Let A be a germ of a diffeomorphism, $A:(\mathbb{R}^n,0)\hookleftarrow$, or $A:(\mathbb{C}^n,0)\hookleftarrow$. Let $A=B^k$. Does this imply that A commutes with some diffeomorphism C such that $C^k=\mathrm{id}$? This is true for the formal power series. Is this true for the diffeomorphisms of the circle?

1971-2. Bifurcations of invariant manifolds in neighborhoods of singular points: see the conjecture on page 3 in the paper: ARNOLD V. I. Remarks on singularities of finite codimension in complex dynamical systems. *Funct. Anal. Appl.*, 1969, **3**(1), 1–5 [*the Russian original is reprinted in*: Vladimir Igorevich Arnold. Selecta–60. Moscow: PHASIS, 1997, 129–137].

1971-3. The algebraic unsolvability of the problem of stability of the equilibrium and of the problem of topological classification of dynamical systems in a neighborhood of a fixed point. See the papers: ARNOLD V. I. Local problems of analysis. *Moscow Univ. Math. Bull.*, 1970, **25**(2), 77–80; ARNOLD V. I. Algebraic unsolvability of the problem of stability and the problem of topological classification of singular points of analytic systems of differential equations. *Uspekhi Mat. Nauk*, 1970, **25**(2), 265–266 (in Russian); ARNOLD V. I. Algebraic unsolvability of the problem of Lyapunov stability and the problem of topological classification of singular points of an analytic system of differential equations. *Funct. Anal. Appl.*, 1970, **4**(3), 173–180.

1971-4. Prove the instability of the equilibrium 0 of an analytic system $\ddot{x} = -\partial U/\partial x$ in the case where the isolated (in $\mathbb{C}^n$?) critical point 0 of the potential U is not a minimum.

1971-5. A smooth map $A:M\to M$ is called *coarse* if any map B that is close to A (with derivatives) is topologically equivalent to A (that is, $B=CAC^{-1}$). Are the coarse maps dense in the space of all smooth maps $\mathbb{S}^1\hookleftarrow$?

1971-6. Do there exist singular points of a vector field of finite codimension that do not allow a topologically versal unfolding with the number of parameters equal to the codimension (or with a finite number of parameters)? The conjectural example in dimension 3: two pairs of imaginary roots with ratio 3 (thesis of R. J. Sacker).

1971-7. Is it true that the set of germs of vector fields at a singular point, whose topological type cannot be determined by any jet of finite order, has infinite codimension? The same question—for Lyapunov stability and asymptotic stability.

1971-8. Investigate the pathology of the decomposition of the space of finite order jets of diffeomorphisms at a singular point, into topological equivalence classes. *Conjecturally, if the dimension and the codimension are large enough, then*:

1) *the set of the equivalence classes is infinite and even continual*;

2) *there exists a manifold in the space of jets such that each jet from this manifold defines the topological type of its germs, but this type changes along the manifold so that for any point in the manifold there are points of another topological type in its neighborhood.*

Investigate analogous questions for the decomposition into Lyapunov (asymptotically) stable and unstable jets. Is the number of connected components of the sets of stability and unstability in the space of jets infinite?

1971-9. Generalize the Hilbert problem on limit cycles to systems with discrete time.

1971-10. Explore the system of biocenos evolution without predators: $\dot{x}_i = x_i\big(A_i\big[\exp\big(\sum_k[-\lambda_{ik}x_k]\big) - 1\big]\big)$.

1971-11. Find (upper and lower?) estimates for the Hausdorff dimension of Navier–Stokes attractors in terms of the Reynolds number.