1085-37-22 **Gaetano Zampieri*** (gaetano.zampieri@univr.it), Dipartimento di Informatica, strada Le Grazie 15, 37134 Verona, Italy. *Some integrable Hamiltonian systems with isochrony or weakly unstable equilibria.*

Consider a smooth vector field f on an open set $A \subseteq R^n$. We say that $\phi : (-\infty, b) \to A$ is an *asymptotic motion* in the past to $\hat{x} \in A$, if $\phi(t)$ is a non-constant solution to $\dot{x} = f(x)$ such that $\phi(t) \to \hat{x}$ as $t \to -\infty$. Of course, the existence of such motions implies that $\hat{x}$ is unstable.

We focus on autonomous Hamiltonian systems. Our first aim is to clarify the concept of Lyapunov instability without asymptotic motions in the past that we briefly call *weak instability*. This is done by means of some examples. In particular we see that weakly unstable Hamiltonian equilibria can be linearly stable.

Our examples are four dimensional and integrable; they belong to a class which contains some rare superintegrable isochronous cases. To identify the non-isochronous unstable cases we show *necessary conditions for isochrony*.

The second aim of the talk is to show some *explicit global isochronous centers* for the scalar equation $\ddot{x} = -g(x)$, $g(0) = 0$, $g'(0) > 0$, on the whole plane.

Gaetano Zampieri, Completely integrable Hamiltonian systems with weak Lyapunov instability or isochrony, *Commun. Math. Phys.* **303** (2011) 73–87. (Received July 16, 2012)