

# 数学与系统科学研究院

## 计算数学所学术报告

报告人: **Prof. Dr. Anatoly Neyshtadt**

( *Space Research Institute of Russian Academy of Sciences, Russia and  
Department of Mathematical Sciences, Loughborough University, UK* )

报告题目:

**Passages through resonances and captures  
into resonance in dynamics of charged  
particles in electromagnetic field**

邀请人: 唐贻发 研究员

报告时间: **2015 年 4 月 10 日 (周五)**

**上午 10:00-11:00**

报告地点: 数学院科技综合楼

**三层 311 报告厅**

## **Abstract:**

Small perturbations imposed on an integrable nonlinear oscillatory system cause a slow evolution of values that were integrals of the unperturbed system. According to the classical averaging method, for an approximate description of this evolution one should average the speed of evolution over all the phases of the unperturbed oscillations. This simple recipe does not always produce correct results due to resonances arising in the process of evolution. The phenomenon of capture into resonance consists in the system starting to evolve in such a way as to preserve the resonance property once it has arisen. When passing through the resonance without capture, the phase trajectories somewhat deviate in a quasi-random manner from the motion predicted by the averaging method. This phenomenon is called a scattering on a resonance. In the talk, a general theory of passages through resonances and captures into resonance, as well as several examples of these phenomena in dynamics of charged particles will be presented.

## **Short Biography:**

Anatoly Neyshtadt is Leading Research Fellow at Space Research Institute of Russian Academy of Sciences, also Professor of Applied Mathematics in Loughborough University (UK). He received his Ph.D. in Mathematics, Moscow State University in 1976 and Doctor of Sciences (Mathematics), Moscow State University in 1990. His research interests include Applied dynamical systems, perturbation theory, and averaging method. He has published one book and over 100 journal papers in these directions. He was an invited speaker at International Congress of Mathematicians (Kyoto, 1990) and International Congress on Theoretical and Applied Mechanics (Warsaw, 2004). He received Lyapunov Prize of Russian Academy of Sciences (joint with D.V. Anosov, 2001) and Russian State Fellowships for Distinguished Scientists of Russia (1998-2003). He served as co-Editor-in-Chief for “Nonlinearity” during 2005-2014. Currently, he serves as Fellow of the Institute of Physics, Member of Russian National Committee on Theoretical and Applied Mechanics, Member of Advisory Committee of Russian Foundation of Fundamental Research, Editor for “Chaos, An Interdisciplinary Journal of Nonlinear Science” and Member of Editorial Board for “Regular and Chaotic Dynamics”.

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