180th Anniversary of the Taras Shevchenko
National University of Kyiv

Taras Shevchenko National University of Kyiv
(Faculty of Cybernetics)
University of Defence, Brno, Czech Republic
International Institute for Applied Systems Analysis (Austria),
Glushkov Institute of Cybernetics of NAS of Ukraine
System Analysis Committee of Presidium National Academy of Sciences of Ukraine
Academy of Sciences "Vyshcha Shkola" of Ukraine
Noosphere Ventures Corporation
Brno Local Chapter of Union of Czech Mathematicians and Physicists

XXIV International Conference
PROBLEMS OF DECISION MAKING UNDER UNCERTAINTIES
(PDMU-2014)

ABSTRACTS

September 1-5, 2014
Cesky Rudolec, Czech Republic

Taras Shevchenko National University of Kyiv
(Faculty of Cybernetics)
University of Defence, Brno, Czech Republic
International Institute for Applied Systems Analysis
(Austria),
Glushkov Institute of Cybernetics of NAS of Ukraine
System Analysis Committee of Presidium National
Academy of Sciences of Ukraine
Academy of Sciences "Vyshcha Shkola" of Ukraine
Noosphere Ventures Corporation
Brno Local Chapter of Union of Czech Mathematicians
and Physicists

XXIV International Conference
PROBLEMS OF DECISION MAKING UNDER UNCERTAINTIES
(PDMU-2014)

September 1-5, 2014

ABSTRACTS

Series B

Cesky Rudolec, Czech Republic

Київ
2014

УДК 007 (100)(06)

ББК 32.81я43

Надруковано за рішенням Вченої Ради факультету кібернетики Київського національного університету імені Тараса Шевченка (протокол № 9 від 16 червня 2014р.)

INTERNATIONAL PROGRAM COMMITTEEA

Nakonechny (Ukraine) - Chairman

M.Bratiychuk (Poland), Yu.Ermoliev (Austria), I.Gaishun (Belarus), I.Herlin (France), J.Kaluski (Poland), V.Korolyuk (Ukraine), A.Lindquist (Sweden), J.Michalek (Czech Republik), I.Sergienko (Ukraine), Yu.Shestopalov (Sweden), R. Viertl (Austria), O.Zakusylo (Ukraine)

NATIONAL ORGANIZING COMMITTEE

A.Anisimov – Chairman

V. Holcner – Chairman

M.Bartish, I.Beyko, O.Iksanov, Ya.Chabanyuk, V.Donchenko, F.Garashchenko, P.Knopov, I.Kharin, E.Lebedev, V.Marcenyuk, M.Sedlačik, N.Semenova, S.Shakhno, F.Sopronyuk, A.Vlasyuk, Ya.Yeleyko, V.Zaslavsky, S. Zhuk

LOCAL ORGANIZING COMMITTEE

P.Zinko – Chairman

O.Lukovych, O.Kapustian,
M.Loseva, T.Korobko,
O.Pavluchenko, T.Zinko,
L.Doudová, D.Hampel,
J.Odehnal, M.Fusek

ISBN 978-966-8725-10-4

CONTENT[1]

ЗМІСТ

---

[1] *The abstracts are publishing in authors edition*
Тези друкуються в авторській редакції

ASYMPTOTIC DISSIPATIVITY OF THE RANDOM EVOLUTION WITH IMPULSE PERTURBATION

[1]Kinash A.V., [2]Chabanyuk Ya.M., [1]Khimka U.T.
[1]National University "Lviv Polytechnic" , Ukraine
[2]Lviv state university of life safety, Ukraine
sunnygirl5@ukr.net

Consider the stochastic system with impulse perturbation given by the stochastic differential equation [1]

$$du^{\varepsilon}(t) = C(u^{\varepsilon}(t); x(t/\varepsilon^4))dt + \varepsilon d\eta^{\varepsilon}(t), u^{\varepsilon}(t) \in \boldsymbol{R}, \qquad (1)$$

with impulse perturbation process $\eta^{\varepsilon}(t) = \int_0^t \eta^{\varepsilon}\left(ds; x(s/\varepsilon^2)\right)$, where family of processes with independent increments determined by generators $\boldsymbol{\Gamma}_u^{\varepsilon}(x)\varphi(u,\omega,x)$ and $\boldsymbol{\Gamma}_{\omega}^{\varepsilon}(x)\varphi(u,\omega,x)$ [2].

The limiting evolution for (1) is a solution of the following equation

$$du(t) = a(u)dt + \sigma(u)dW(t), \qquad (2)$$

where $W(t)$ - Wiener process and $a(u)$ has the representation $a(u) = \int_X C(u;x)\pi(dx)$. Limiting difussion $\sigma(u)\sigma^*(u) = B(u)$, where $B(u) = 2\int_X b_1(x)\boldsymbol{R}_0 b_1(x)\pi(dx) + \int_X b_2(x)\pi(dx)[2]$.

Let also satisfied the condition of balance $\int_X b_1(x)\pi(dx) \equiv 0$.

Definition. System (1) is called asymptotically dissipative if it is dissipative limiting evolution (2).

Theorem Let process $\left(u^{\varepsilon}(t), \eta^{\varepsilon}(t)\right)$ satisfied weakly convergence conditions. In addition, for $c_1 > 0, c_2 > 0$ conditions $a(u)V'(u) < -c_1 V(u)$, $\sup_u \| \sigma(u) \| < c_2$ and condition of balance are satisfied.

Then the system (1) is asymptotically dissipative.

References

1. Кінаш А.В. Асимптотична дисипативність дифузійного процесу. / А.В. Кінаш, Я.М. Чабанюк, У.Т. Хімка // XXIII International Conference «Problems of Desicion Making Under Uncertainties». Abstracts. - May12-16, - 2014, - Мукачево, Україна. – С.115– 116.
2. Korolyuk V.S. Stochastic Systems in Merging Phase Space/ Korolyuk V.S., Limnios N. – :World Scientific Publishing, – 2005. – 330 p.

THE NEW INVERSE BURGERS DYNAMICAL SYSTEM AND ITS INTEGRAL SUBMANIFOLD

Kindybaliuk A.A., Prytula M.M.
Ivan Franko National University of Lviv, Ukraine
mykola.prytula@gmail.com

Recently the inverse Burgers dynamical system for the Burger's equation $u_t + uu_x = u_{xx}$ was introduced in [2] in the next form:

$$\begin{cases} u_t = v, \\ v_t = u_x + uv. \end{cases} \qquad (1)$$

We have obtained different inverse Burgers system in next form:

$$\begin{cases} u_t = v + \frac{1}{2}u^2 \\ v_t = u_x. \end{cases} \qquad (2)$$

The main goal of system (2) is ability to rewrite it as a set of differential forms generating the closed Cartane-integrable ideal [1].

Theorem. *The set of first order equations (2) is equivalent to the set of second rank differential forms* $\{\alpha^{(2)}\}$ *constructing integral submanifold:*

$$\begin{cases} \alpha_1^{(2)} := du \wedge dx + vdx \wedge dt + \left(u^2/2\right)(dx \wedge dt), \\ \alpha_2^{(2)} := du \wedge dt + dv \wedge dx, \end{cases} \qquad (3)$$

Ideal is closed $dI(\alpha) \subset I(\alpha)$ *:* $\begin{cases} d\alpha_1^{(2)} := (dx - dt) \wedge \alpha_2^{(2)}, \\ d\alpha_2^{(2)} := 0. \end{cases}$

References

1. *Hentosh O.* Differential-geometric and Lie-algebraic foundations of investigating nonlinear dynamical systems on a function manifolds. The second edition. / *O. Hentosh, M. Prytula, A. Prykarpatsky* // L'viv University Publ., L'viv, Ukraine, 2006. (in Ukrainian).
2. *Prytula M.M.* Application of the methods of computer algebra for finding the conservation laws of nonlinear inverse Burgers dynamical system/ *M.M. Prytula, O.M. Dmukhovska* //Conference Applications of numerical techniques, mathematical modeling and mathematical methods in science research.// Lviv, 1994, p. 66 – 67. (in Ukrainian).