

An aerial photograph of a long, white truss bridge spanning a vast blue lake. The bridge starts from the bottom left and extends towards the horizon. In the middle of the bridge, there is a small, green island. The sky is a clear, light blue.

**International Conference
on Differential Equations,
Mathematical Physics
and Applications**

BOOK of ABSTRACTS

**October 17-19, 2017
Cherkasy, Ukraine**

Organized by

**Ministry of Education and
Science of Ukraine**

**Bohdan Khmelnytsky
National University of Cherkasy**

**Vasyl' Stus Donetsk
National University**

**Institute of Mathematics
of NAS of Ukraine**

**Institute of Applied Mathematics and
Mechanics of NAS of Ukraine**

**G.V. Kurdyumov Institute
for Metal Physics of NAS of Ukraine**

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Suvorova I.G., <i>Investigation the hydrodynamics of flows in channels of complex geometric forms</i>	84
Trofymenko O.D., <i>Convolution equations and two-radii theorems for solutions of linear elliptic equations with constant coefficients in the complex plane</i>	85
Vorobyova A., <i>Group analysis of wave equation with special right-hand side</i>	87
Yehorchenko I., <i>Relative differential invariants and invariant equations equations</i>	88
STOCHASTIC DIFFERENTIAL EQUATIONS	90
Borysenko O.D., Borysenko D.O., <i>Global solution to stochastic logistic equation</i>	90
Buchak Kh.V., Sakhno L.M., <i>Investigation of properties of time-changed Poisson processes</i>	91
Doobko V.A., <i>Derivation of the diffusion equation in random fields from the special Langevin equation</i>	92
Ivanov I.L., <i>Correlation results for some foreign exchange markets</i>	93
Kozachenko Yu.V., Petranova M.Yu., <i>Simulation of the Ornstein-Uhlenbeck process</i>	94
Lohvinenko S.S., <i>Parameters estimation in fractional Vasicek model</i>	95
Osypchuk M.M., Portenko M.I., <i>Jump theorem and its applications</i>	97
Pashko A., Vasylyk O., <i>Accuracy of simulation of fractional Brownian motion in $L_p([0, T])$ and $C([0, T])$</i>	98
Pryhara L.I., Shevchenko G.M., <i>Regularity of solution to the wave equation with a coloured stable noise</i>	100
Radchenko V.M., <i>Averaging principle for heat equation driven by general stochastic measure</i>	101
Ralchenko K.V., <i>Statistical inference for fractional Ornstein-Uhlenbeck process</i>	102
Ralchenko S.A., <i>Existence and uniqueness of solutions to stochastic differential equations driven by fractional Brownian field</i>	103
Rozora I.V., <i>Some properties of impulse response function</i>	105
Sakhno L.M., <i>CLT for quadratic forms for random fields with tapered data and asymptotic properties of minimum contrast estimators</i>	106
Shklyar S., Ralchenko K.V., Mishura Yu., <i>Maximum likelihood estimation of the drift slope of a Gaussian process</i>	107
Tsukanova A.O., <i>On comparison theorem for the Cauchy problems to neutral stochastic integro-differential equations</i>	107
Yamnenko R.E., Yanevych T.O., <i>Some properties of random processes from Orlicz spaces of exponential type</i>	110
MATHEMATICAL PROBLEMS OF PHYSICS AND MATERIALS SCIENCE	111
Auzinger W., <i>Adaptive integration of large linear systems of Schrödinger type with time-dependent coefficients using Magnus-type methods</i>	111
Bezpalcuk V., Kozubski R., Gusak A., <i>Simulation of the tracer diffusion and ordering kinetics in FCC structures - Stochastic Kinetic Mean-Field Method</i>	112
Bhat A.P., Dhoble S.J., Rewatkar K.G., <i>Effect of rare earth doped metamaterial towards the antenna miniaturisation and substrate primitive</i>	113
Bobrov O., Pasichnyy M., Gusak A., <i>Size effect on distributions of times to failure and times to transformations</i>	114
Bondarchuk S.V., Minaev B.F., <i>First principles DFT study of structural, electronic and mechanical properties of two-dimensional nitrogen monolayers</i>	115
Borisenko A., <i>Nominal vs. active supersaturation of solutions</i>	116
Gavriliuk A.M., Kachurik I.I., <i>Hermitian Hamiltonian built from Non-Hermitian position/momentum operators, and deformed oscillators</i>	117
Gokhman O., Terentyev D., Kondrea M., <i>Investigation of the post-irradiation annealing on the defect structure of tungsten</i>	117

where: $p(k, tt) = \frac{\gamma(k, tt)}{\Gamma(k)}$, $\Gamma(k) = \gamma(k, +\infty)$, $\gamma(k, tt) = \int_0^{tt} x^{k-1} e^{-x} dx$.

7. In the case $G \gg 1$ we can limit ourselves to the formation and growth of single pore. Then we suggest some heuristic considerations: The time to reach a certain probability P with the failure criterion $X_{threshold}$, approximately equal: $tt \approx T_1 + T_2$, were T_1 - waiting time of pore nucleation, T_2 - growth time of the single pore. $T_1 = -\ln(1 - P)$, $T_2 \approx \frac{f(X)}{G}$. If we make the transition to dimensional units, then:

$$t \approx (-\ln(1 - P) + \frac{f(X)}{V}) \frac{1}{\nu L^2} \approx \frac{-\ln(1 - P)}{\nu L^2} + f(X) \frac{L}{V}. \quad (4)$$

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First principles DFT study of structural, electronic and mechanical properties of two-dimensional nitrogen monolayers

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The single-bonded 2D nitrogen allotropes of the honeycomb (A7) and zigzag sheet (ZS) topology are calculated by density functional theory (DFT). The optical, thermodynamic and elastic properties of these 2D sheets have been calculated for the first time. Phonon dispersion calculations have justified these structures as vibrationally stable 2D materials. The IR spectroscopy can not be useful in the characterization of the studied materials, while the Raman spectroscopy can be effectively applied for the experimental spectral identification. (the calculated IR intensity completely failed for detection). The UV absorption spectra prediction demonstrates complete opacity of the A7 and ZS monolayers to the UV irradiation above 9 and 6 eV (140 and 210 nm), respectively. Thus, the studied materials are predicted to be transparent to visible light. Calculations of NMR magnetic shielding tensors indicates that the electron density arrangement around the nitrogen nuclei in the studied polynitrogen sheets is much denser compared to the N₂ molecule. The elastic constants reveal a robust mechanical stability of the studied 2D nitrogen allotropes and the calculated Young moduli values are only twice as lower than that of the graphene molecule.