$x^0 = \left(x_1^0, x_2^0, ..., x_n^0 \right)$ – given point received on the previous iteration, $d = \left(d_1, d_2, ..., d_n \right)$ – given vector of minimum search.

The main methods of one-dimensional optimization, and then – multidimensional, are described.

The main algorithms, which are discussed, were implemented in Mathcad. Examples of solution of many extremal problems are presented.

NUCLEOSYNTHESIS AT MAGNETOROTATIONAL SUPERNOVA EXPLOSION AND GALACTIC CHEMICAL EVOLUTION

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Strong magnetic fields are considered as noticeable pressure component for magnetorotational supernova explosion. At such fields magnetic modification of nuclear structure is shown to shift the nuclear magic numbers in the iron region towards smaller mass numbers approaching titanium [1]. Respectively, maximum of nucleosynthesis products is modified with an enhancement of titanium yield. The results are corroborated with an excess of ^{44}Ti revealed from the INTEGRAL mission data for yang supernova remnants at a field strength ranging up to ten teratesla. Such magnetic impact on nucleosynthesis in galactic chemical evolution is discussed.

[1] V.N. Kondratyev, et al OAP **28**, 168 (2015); EPJ WebConf. **107**, 10006 (2016); **117**, 09007 (2016).

THE MEAN LIGHT CURVES OF THE MIRA-TYPE STARS IN THE H- AND K-BAHDS

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For nine Mira-type stars and one semiregular star the mean light curves have been obtained. The initial values of the brightness (observations) were fitted by a trigonometric polynomial. The parameters and fourier-coefficients (degree of the trigonometric polynomial, amplitude of the brightness, the maximal slope of ascending and descending branch, semiamplitudes and initial epochs for the brightness maximum (minimum magnitude), etc. The mean light curves of the investigated stars are symmetric in the near infrared region (H and K).

A SEARCH OF FS CMA TYPE HOT STARS SURRONDED BY CIRCUMSTELLAR DUST

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FS CMa type hot stars surrounded by circumstellar dust has both photometric and spectroscopic signatures. Photometrically it manifests itself by a large infrared excess due to radiation of the circumstellar dust. This feature can serve as a selection criterion for finding new candidates in large photometric databases. Based on color-indices of known objects showing the phenomenon, we searched all-sky catalogs which contain optical and near-IR magnitudes. Recent all-sky photometric surveys at optical and infrared wavelengths obtained with a high positional accuracy (such as UCAC4, 2MASS, WISE) allowed searching for all kinds of objects with circumstellar envelopes. Using our experience in identifying hot stars surrounded by circumstellar dust, we continued searching for more candidates to this type of object. In this talk we present spectral energy distributions of newly found 20 candidates and discuss their possible nature as well as photometric criteria for further searches.

ON THE PROBLEM OF DETERMINING THE SCALE OF OCCURRENCE OF KEY EVENTS IN THE DEVELOPMENT OF STAR SYSTEMS

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Presentation of the evolution of star systems in the form of directed graphs [1] means the calculation of the probabilities of the key events and the times of their occurrence for each stage of their development. This representation reduces the evolution to a discrete process in which the transition from one state to another occurs abruptly. The time between consecutive key events passes depending on the occurring in the star system processes. On the one hand, if the processes that "control" the development of the system will be defined more accurately, then the probabilities of key events can be calculated more accurately. On the other hand, - outlined processes determine the scale of the development time of the star system.

As was shown earlier [2, 3], the calculation of key events of the development of the star system is reduced to

choosing of certain initial mass spectra of the evolving components of the star systems. Defining of realistic physical conditions in the system for each stage of evolution allowed us to obtain a certain set of mass spectra, which allow performing calculations of key events associated with development of stars systems [4]. The general principles for calculating a time scale of the star system to date has not yet been developed.

The paper analyzes the patterns of occurrence of key events in order to develop a common approach for a fundamental algorithm for calculating a total timescale of star systems and its components.

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2. Zakhozhay V.A // Proc. Crimean Astroph. Observ., T. 2009. 104, № 6. P. 80.
3. Zakhozhay V.A. // Proc. GAO in Pulkovo, 2009, № 219, issue 4., P. 105.
4. Zakhozhay V.A., Minakov A.A., Shulga V.M. // Proc. of the 10-th Conf. of Gamow's Astron. School, Aug. 23-28, 2010 - Odessa, Ukraine. P. 115.

РАЗРАБОТКА И ИЗГОТОВЛЕНИЕ МОДУЛЯ АВТОМАТИЧЕСКОГО ПЕРЕКЛЮЧЕНИЯ СВЕТОФИЛЬТРОВ ДЛЯ ТЕЛЕСКОПА ЗТС 702

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В работе представлены результаты разработки блока автоматического управления турелью светофильтров на телескопе ЗТС-702 Астрономической обсерватории Николаевского национального университета имени В.А.Сухомлинского. Телескоп оснащен приемником изучения SBIG CCD ST7, для которого был изготовлен блок светофильтров с ручным переключением. В блоке были установлены 5 стандартных UBVRI фильтров, в 6-м окне находится прозрачное стекло ПС для работы с интегральным потоком. При длине трубы телескопа (~3м) механический блок переключения фильтров не всегда давал хорошие результаты.

Для упрощения процесса наблюдений нами был изготовлен электронный блок переключения светофильтров и разработана программа управления этим блоком. Блок установлен на телескопе и испытан в рабочем режиме. Угол поворота турели светофильтров кратен 60° с высокой точностью: центр нужного светофильтра стабильно располагается на оптической оси приемника излучения. За время испытаний установки сбоев, например, установки «не того» светофильтра не было.

Модуль управления автоматическим переключением светофильтров, существенно уменьшает потери времени: для установки соседнего светофильтра в рабочее положение нужна всего 1 секунда, а максимальное время для вывода нужного светофильтра в рабочее положение составляет менее 5 секунд. Быстрое переключение светофильтров позволит повысить эффективность использования рабочего времени астрономи-ческой обсерватории имени Калиненкова Николаевского национального университета.

LIVE DVD "UBUNTU ASTRONOMY 16.04" 64-BIT

Oleh Malyi
Portugal

The following distributive is designed for the astronomy amateurs that are familiar with OS Ubuntu (Linux) OS. It is free to download and utilize.

It includes different types of programms: planetariums, obtaining and edition of astronomical images, telescopes' and other equipment's control through the library and the INDI server.

In order to get familiar with the content in Live DVD mode, you only have to download the *.iso image format and run it with a virtual machine. One can also create an installation DVD or USB flash drive.

The Cartes du Ciel / Skychart enables an acess to the collection of the sky atlases. This software allows a big range of possibilities to study celestial objects: virtual observatory mode, SAMP protocole support, conversion of text catalogues for a graphical display with the help of the built-in CatGen. It also includes a HNSKY sky atlas which has a telescope control funcion through the INDI server. The Virtual Moon Atlas is designed for the Moon study and its planetary analogue is aimed for exploring Mercury, Venus and Mars.

If you want to create a robotic observatory, one can use KStars, a program which has a big set of necessary tools. Stellarium, Celestia, Digital Universe, BoPlanet, Where Is M13 are the planetariums and interactive night sky maps installed on the DVD.

You can use Lin_guider and PHD2 for the autoguiding during astro-photo sessions. The INDI server and equipment drivers' control is operated through indistarter. wxAstroCapture, Audela and oaCapture are used for the Moon and planets shooting, while CCDciel, GoQat, OpenSkyImager, Audela and KStars are used for taking photos of deep-sky objects.

The digital cameras' support is made through the *libgphoto2* library. It is also used by Entangle, a cameras control program and one of the INDI drivers.

The processing of astronomical images is made through AstroimageJ, Siril, THELI GUI, Lxnstack, ImPPG, GCX, C-Munipack, Stackistry, Regim, MicroObservatoryImage.

SAODS9, fv FITS Editor, APT, Aladin, nip2 are installed for the *.FITS analysis and editing.

Concerning the search and exploration of variable stars, there are two programes installed on the disc: C-Munipack and Vstar. Observation Manager performs a role of an observations' planner.

"UBUNTU ASTRONOMY 16.04" 64-BIT disc is free for download, distribution and use.