Uloga i značaj rukovodilaca na MOAA

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Međunarodna olimpijada iz astronomije i astrofizike (MOAA)

Izvod iz Statuta MOAA

- *#4*

- *... In addition to the students, two accompanying persons are invited from each country, one of which is designated as delegation head (responsible for the whole delegation), and the other – as pedagogical leader (responsible for the students). The accompanying persons become members of the International Board, where in they have equal rights. Members of the International Board are treated as contact persons for the participating countries concerning the affairs of the International Olympiad on Astronomy and Astrophysics until the following competition. ...*

- *The delegation head and pedagogical leader must be selected from scientists or teachers, capable of solving the problems of the competition competently. Normally each of them should be able to speak English.*

Pre olimpijade:

- *- izbor rukovodilaca (po tradiciji, jedan je predsednik NAOK-a, a drugi je obično iz redova članova NAOK ili instruktora - pouzdan predsednikov saradnik).*
- *- Administrativni poslovi - veći deo obavlja predsednik NAOK (korespondencija sa nadležnim ministarstvima, potencijalnim sponzorima, roditeljima učenika, ...) .*
- *- Da obezbede uslove za intenzivne pripreme (dodatna nastava, obezbeđenje opreme) i odlazak na takmičenje.*

Za vreme olimpijade:

- *- stalna briga o učenicima (bolesti, povrede, ...), rešavanje disciplinskih, moralnih i etičkih problema;*
- *- Diskusija i donošenje odluka u vezi formulacije, korektnosti, ..., zadataka i rešenja;*
- *- Pravičnost raspodele poena po zadacima i delovima zadatka;*
- *- Korektan prevod sa engleskog na* ***srpski*** *(izražavanje - zašto instrukcija kad može uputstvo, terminologija - moment=impuls i momentum=količina kretanja i etika);*
- *- Savesno i detaljno pregledanje radova;*
- *- Prigovori - borba za svaki zasluženi poen za svakog takmičara;*

Gura Humorului, Rumunija, 2014.

Sastanak Međinarodnog odbora

Međunarodni odbor (1/2)

- *- Pripreme za satanke Međunarodnog odbora olimpijade - sastanci na kojima se odlučuje o svim pitanjima vezanim za olimpijadu. Primeri:*
- *1) Srbija je na IX MOAA (Indonezija, 2015) predložila da se ustanovi spisak konstanti i veličina koji bi se koristio na svakoj olimpijadi; na X olimpijadi (Indija, 2016) spisak koji je Srbija predložila jednoglasno je prihvaćen glasanjem i od XI olimpijade (Tajland, 2017) će biti u zvaničnoj upotrebi.*

Constants and quantities – proposal for a standard for future IOAAs

Note 1: Astronomical constants and quantities have been adopted from the most recent (2009 and 2014) IAU official recommendations, IAU Division 1 Working Group Numerical Standards for Fundamental Astronomy IAU 2009 System of Astronomical Constants [1]. Physical constants and quantities are adopted from the most recent (2010, every 4 years) recommendations of the Committee on Data for Science and Technology – CODATA [3]; also the numerical values of quantities which are exactly defined. The system of units is International System – IS provided by International Bureau of Weights and Measures (Le Système international d'unités – SI, Bureau Internationale des Poids et Measures – BIPM) [4]. Non SI units are given if it is needed.
Note 2: Keep the list of constants simple and short! All constants or quantities needed to solve particular task which are not in the list, must be defined and provided in the task. This is a proposal to start with. During the time, we (the IOAA IB members) can adjust the list according to our needs.

NOTE: USE AS MANY SIGNIFICANT DIGITS AS YOU NEED!

Physical Constants and Quantities [3]		
Speed of light in vacuum (exact)	$c = 2.997\,924\,58 \times 10^{8}$	$\mathrm{m\,s^{-1}}$
Gravitational constant	$G = 6.673\,84(80) \times 10^{-11}$	$\mathrm{m^3\,kg^{-1}\,s^{-2}}$
Planck constant	$h = 6.626\,069\,57(29) \times 10^{-34}$	$\mathrm{J\,s}$
Boltzmann constant	$\kappa_B = 1.380\,648\,8(13) \times 10^{-23}$	$\mathrm{J\,K^{-1}}$
Stefan-Boltzmann constant	$\sigma = 5.670\,373(21) \times 10^{-8}$	$\mathrm{W\,m^{-2}\,K^{-4}}$
Wien displacement law constant, $b = \lambda_{max}T$	$b = 2.897\,772\,1(26) \times 10^{-3}$	$\mathrm{m\,K}$
Elementary charge	$e = 1.602\,176\,565(35) \times 10^{-19}$	C
Electron mass	$m_e = 9.109\,382\,91(40) \times 10^{-31}$	kg
Proton mass	$m_p = 1.672\,621\,777(74) \times 10^{-27}$	kg
Neutron mass	$m_n = 1.674\,927\,351(74) \times 10^{-27}$	kg

Astronomical Constants and Quantities [5]	
Astronomical unit	$1\,\mathrm{au} = 1.495\,978\,707\,00(3) \times 10^{11}\,\mathrm{m}$
Parsec	$1\,\mathrm{pc} = 3.085\,677\,581\,49 \times 10^{16}\,\mathrm{m} =$
	$= 206\,264.806\ldots\,\mathrm{au} = 3.262\ldots\,\mathrm{ly}$
Day (≈ menan solar day*)	$1\,\mathrm{d} = 24\,\mathrm{h} = 86\,400\,\mathrm{s}$
1 mean sideral day	$= 0^{d}.997\,269\,60 = 23^{h}56^{m}4^{s}.1$
Julian year (symbols "yr" and "y" are also used)	$1\,\mathrm{a} = 365^{d}.25$
1 tropical year (equinox to equinox)	$= 365^{d}.242\,190$
1 sidereal year (fixed star to fixed star)	$= 365^{d}.256\,363$
North ecliptic pole (J2000.0)	$(\alpha_E, \delta_E) = (18^h0^m0^s, +66°33'38.5'')$
North galactic pole (J2000.0)	$(\alpha_G, \delta_G) = (12^h51^m26^s.3, +27°7'41.7'')$
Hubble constant** [7]	$H_0 = 73.8 \pm 2.4\,\mathrm{km\,s^{-1}\,Mpc^{-1}}$

*One mean solar day is approximately equal to one day defined as 86 400 SI seconds. Current mean solar day is longer than day 0.003 seconds.
**I propose to use this particular value of H_0 for two reasons: 1) it is obtained by using distance ladder method based on Hubble Space Telecope observations of more than 600 cepheide variables and more than 250 SNe Ia; 2) a wide range of ages and fates of the Universe is consistent simply with homogeneity, isotropy and expansion at this rate.

Explanation: numerical values can be, for example, written in the form 1.234(55), where the number in parentheses indicates the uncertainty. The place-value is such that the last digit of the uncertainty lines up with the last digit of the nominal value. Therefore 1.234(55) is just a more compact way of writing 1.234 ± 0.055.

Sun	
Radius [2]	$R_\odot = 696\,000\,\mathrm{km}$
Angular diameter at mean Earth distance [8]	$\rho_\odot = 32' = 0.0090^{rad}$
Mass [5]	$M_\odot = 1.9884(2) \times 10^{30}\,\mathrm{kg}$
Effective temperature [8]	$T_{eff\odot} = 5777\,\mathrm{K}$
Luminosity [8]	$L_\odot = 3.845 \times 10^{26}\,\mathrm{W}$
Absolute bolometric magnitude [8]	$M_{bol\odot} = +4.74$
Apparent bolometric magnitude [8]	$m_{bol\odot} = -26.83$
Absolute visual magnitude [8]	$M_{V\odot} = +4.82$
Apparent visual magnitude (mid-day) [8]	$m_{V\odot} = -26.75$
Earth	
Radius (mean) [2]	$R_\oplus = 6\,371.0084(1)\,\mathrm{km}$
Mass [5]	$M_\oplus = 5.9722(6) \times 10^{24}\,\mathrm{kg}$
Major semiaxis (J2000.0) [8]	$a_\oplus = 149.60 \times 10^{6}\,\mathrm{km}$
Orbital eccentricity (J2000.0) [8]	$e = 0.01671022$
Obliquity of the ecliptic, mean (J2000.0) [5]	$\varepsilon = 23°26'21''.406 \pm 0''.001$
Moon	
Radius (mean) [2]	$R_☾ = 1\,737 \pm 1\,\mathrm{km}$
Mass (calculated from [2])	$M_☾ = 7.3458(7) \times 10^{22}\,\mathrm{kg}$
Distance from the Earth (mean) [8]	$d = 384\,401 \pm 1\,\mathrm{km}$
Orbit eccentricity [8]	$e = 0.05490$
Apparent visual magnitude (full moon) [8]	$m_☾ = -12.74$
Angular diameter at mean geocentric distance [8]	$\rho_☾ = 31'5''.2$
Inclination to the ecliptic, mean (J2000.0) [8]	$i = 5°8'43''.42$

Planet	Radius (mean) [2] [km]	Mass** [5] [$\times 10^{24}$ kg]	Major semiaxis [6] [au]	Eccentricity [6]
Mercury	2439.7(1)	0.330 10	0.387 099 27	0.205 635 93
Venus	6051.8(1)	4.8673	0.723 335 66	0.006 776 72
Mars	3389.50(20)	0.641 69	1.523 710 34	0.093 394 10
Jupiter*	69 911(6)	1898.1	5.202 887 00	0.048 386 24
Saturn*	58 232(6)	568.31	9.536 675 94	0.053 861 79
Uranus*	25 362(7)	86.809	19.189 164 64	0.047 257 44
Neptun*	24 622(19)	102.41	30.069 922 76	0.008 590 48

*Radii corespond to one-bar surface.
**Atmosphere of the planets included, satellites excluded.

Sferical trigonometry, Gauss's formulas:

$\cos a = \cos b \cos c + \sin b \sin c \cos A$ — cosine theorem
$\sin a \sin B = \sin b \sin A$ — sine theorem

Approximative formulas:

$\log(1+x) \approx x \dfrac{1}{\ln 10}$ when $|x| \ll 1$
$(1 \pm x)^m \approx 1 \pm mx$ when $|x| \ll 1$
$e^x \approx 1 + x$ when $|x| \ll 1$
$\sin x \approx x$ when $x \approx 0^{rad}$
$\cos x \approx 1$, or $\cos x \approx 1 - \dfrac{x^2}{2}$ when $x \approx 0^{rad}$

Konstante i fiz.veličine

u zvaničnoj upotrebi od XI olimpijade (Tajland, 2017).

Međunarodni odbor (2/2)

- *2) Srbija se uključila u rešavanje problema rangiranja zemalja učesnica.*
  - *Rangiranje zemalja je po istom principu kao na sportskoj olimpijadi. Mnogi su nezadovoljni postojećim sistemom zbog mnogih uočenih anomalija.*

Posle olimpijade:

- *- Administrativni poslovi - izveštaji (finansijski i opisni) MPNTR-u, DAS-u, sponzorima, ...*
- *Rešavanje problema sa nadležnim ministarstvom u vezi finansiranja priprema i odlaska na olimpijadu.*
- *-Medijska promocija.*