

BGL-17 in Gyöngyös

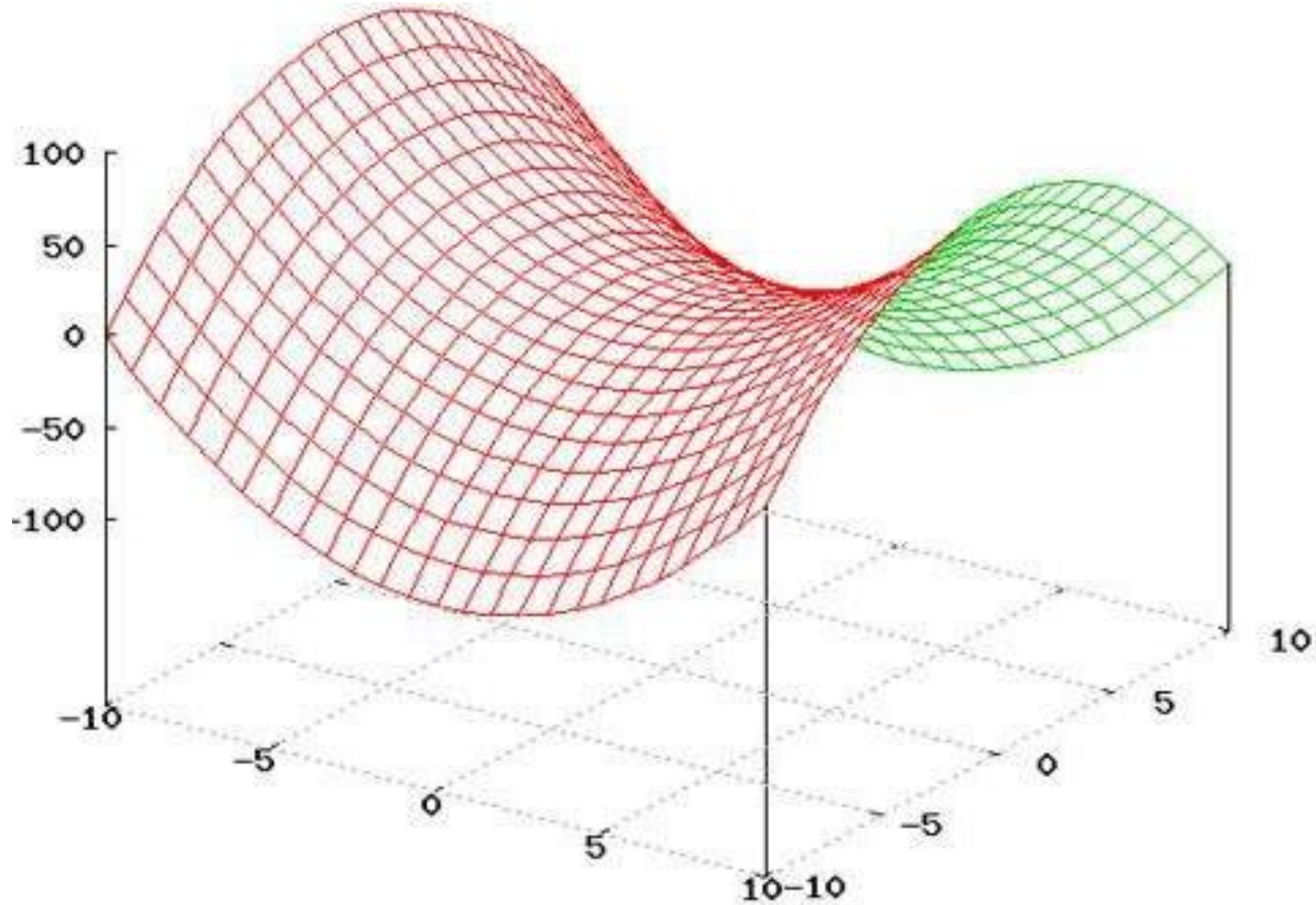
*Hyperboloids in architecture*  
*(and in science fiction)*

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## *Plan:*

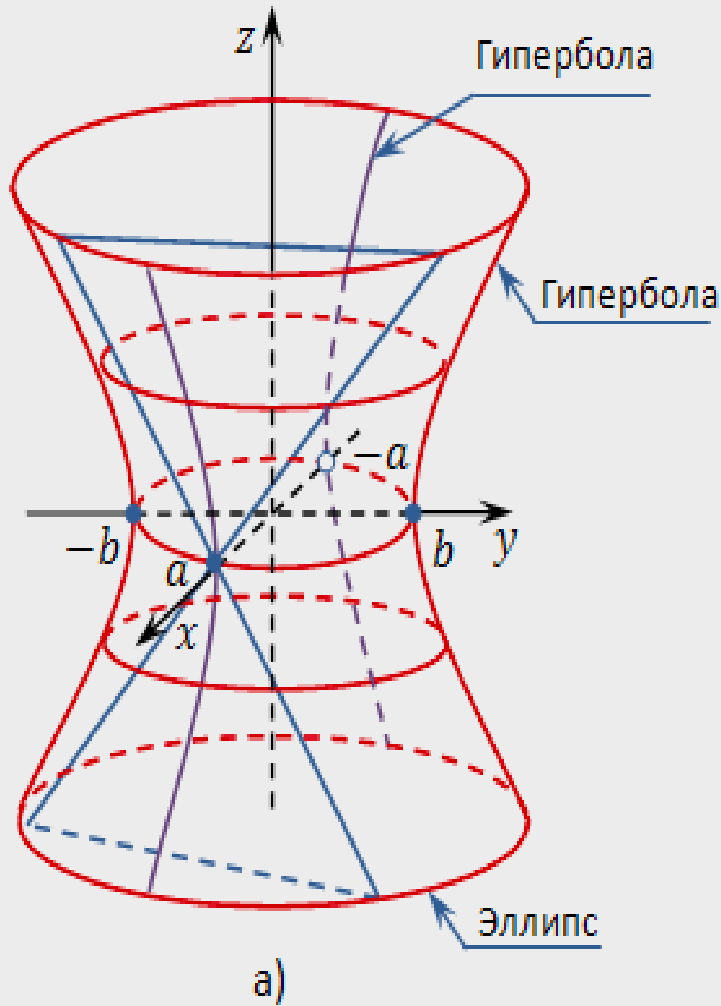
- Hyperboloid geometry: the doubly deformed hyperboloid surface is shaped by moving STRAIGHT lines in opposite directions, thus creating a curved surface (instead of a flat one), Moire effect;
- V.G. Shukhov's **(Владимир Григорьевич Шухов)** and his constructions; double curved surfaces made of straight line elements;
- Illustrations (constructions);
- *Appendix:* Garin's hyperboloid (by A.K. Tolstoi);

By wrapping and sticking a saddle (below) on gets a hyperboloid (next slide).



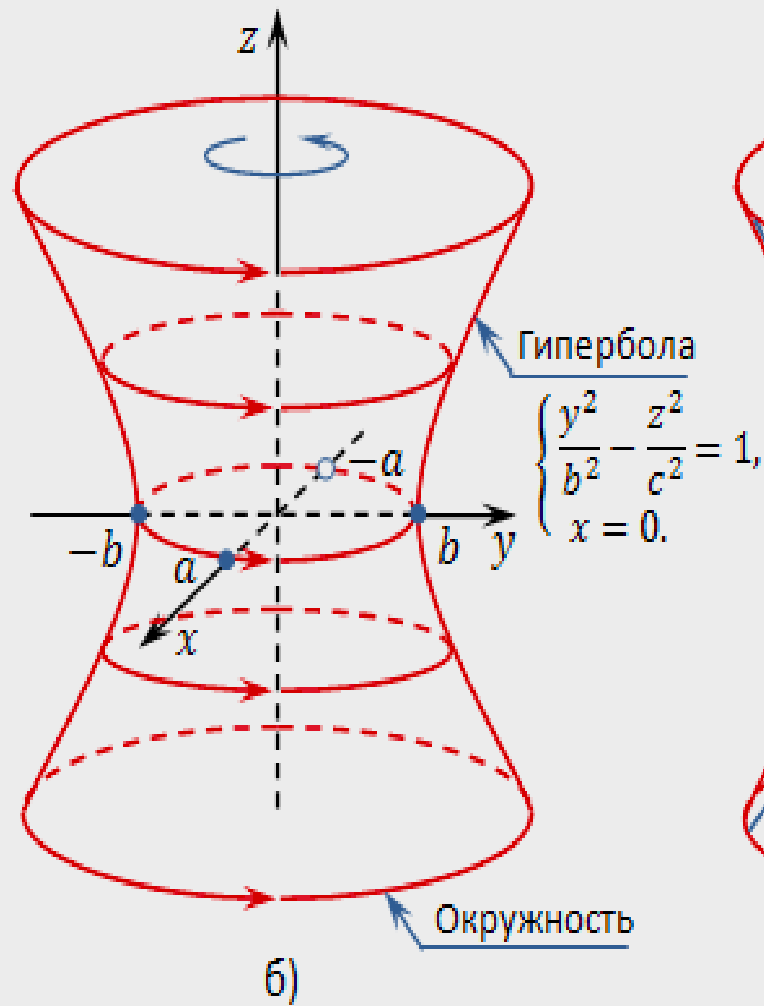
Сечения однополостного  
гиперboloида

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1$$



Однополостный гиперboloид  
вращения

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1, \quad a = b$$



Прямолинейные  
образующие  
однополостного  
гиперboloида

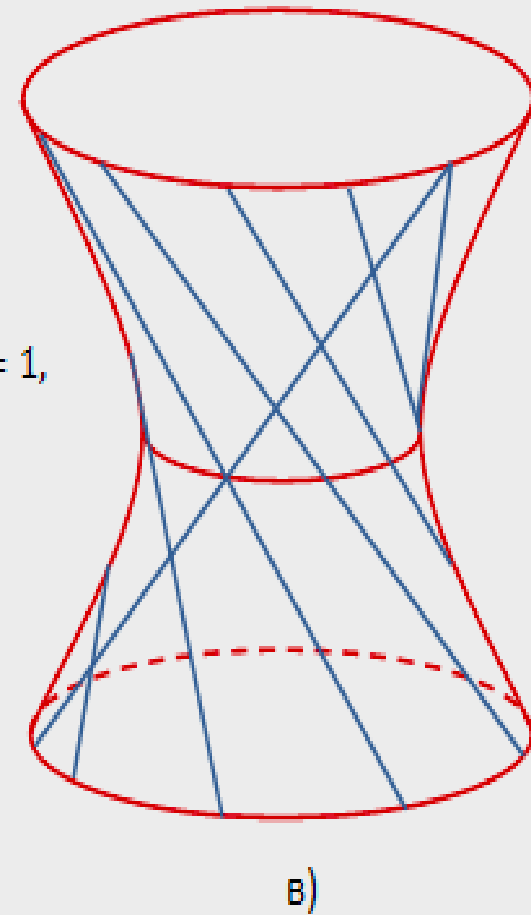
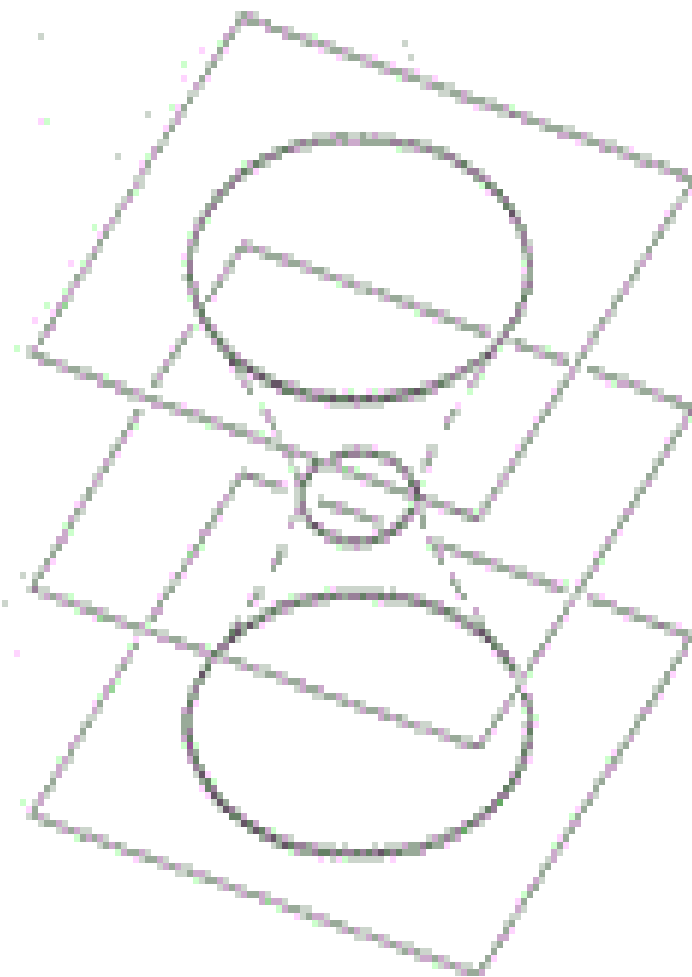
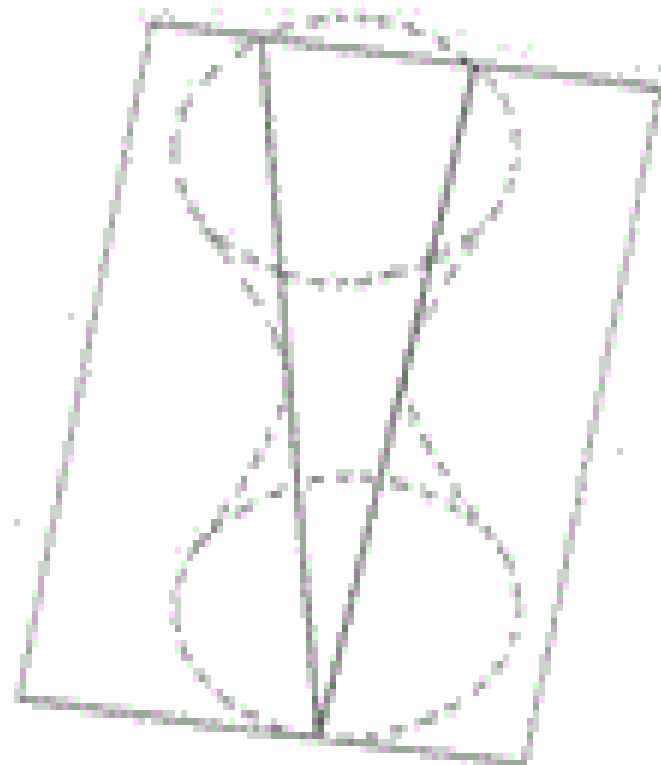
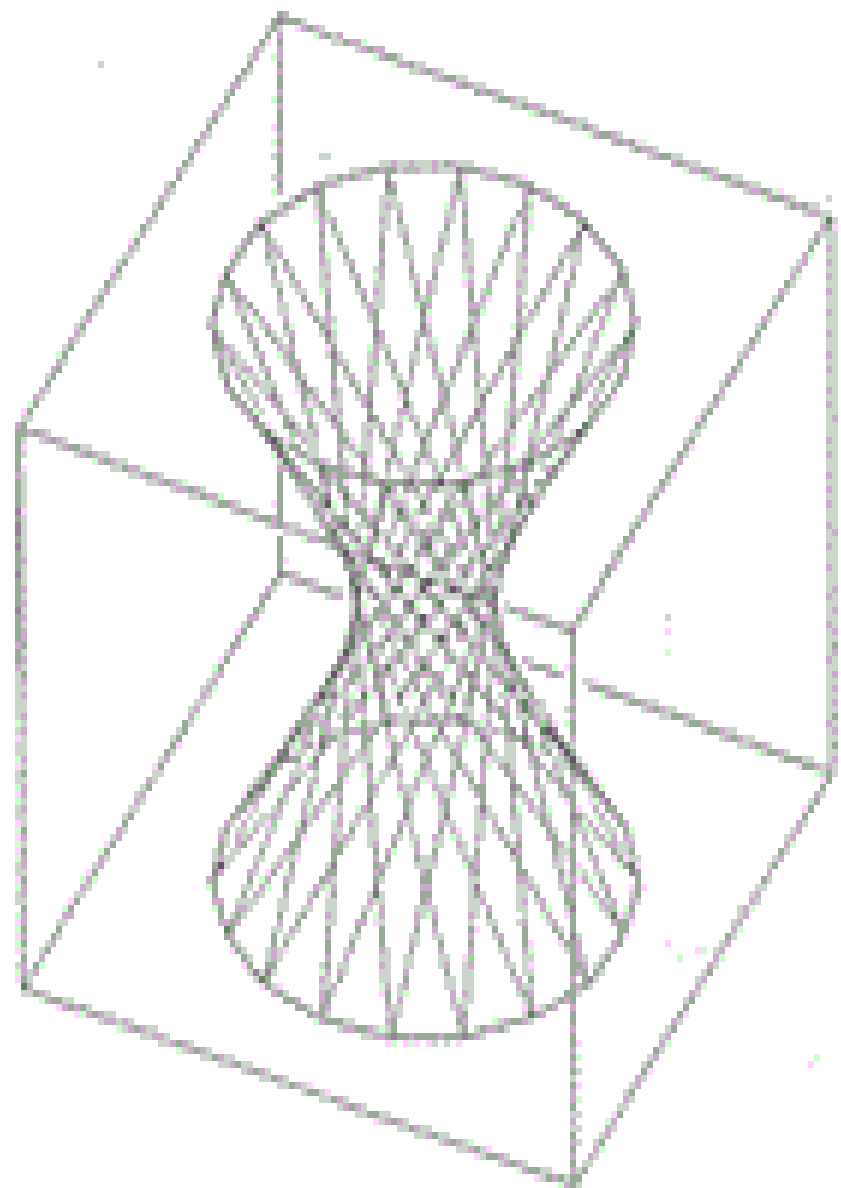
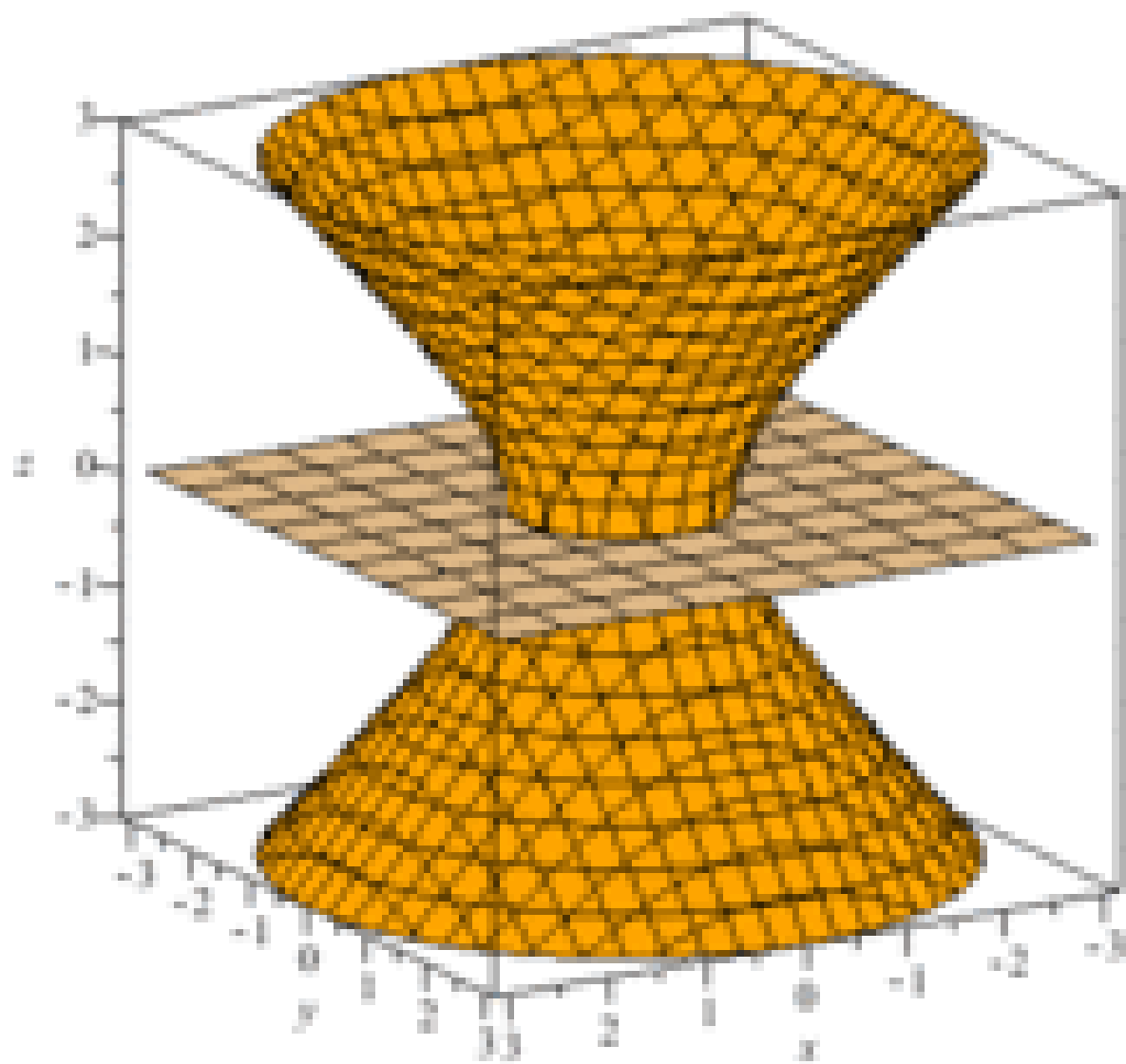
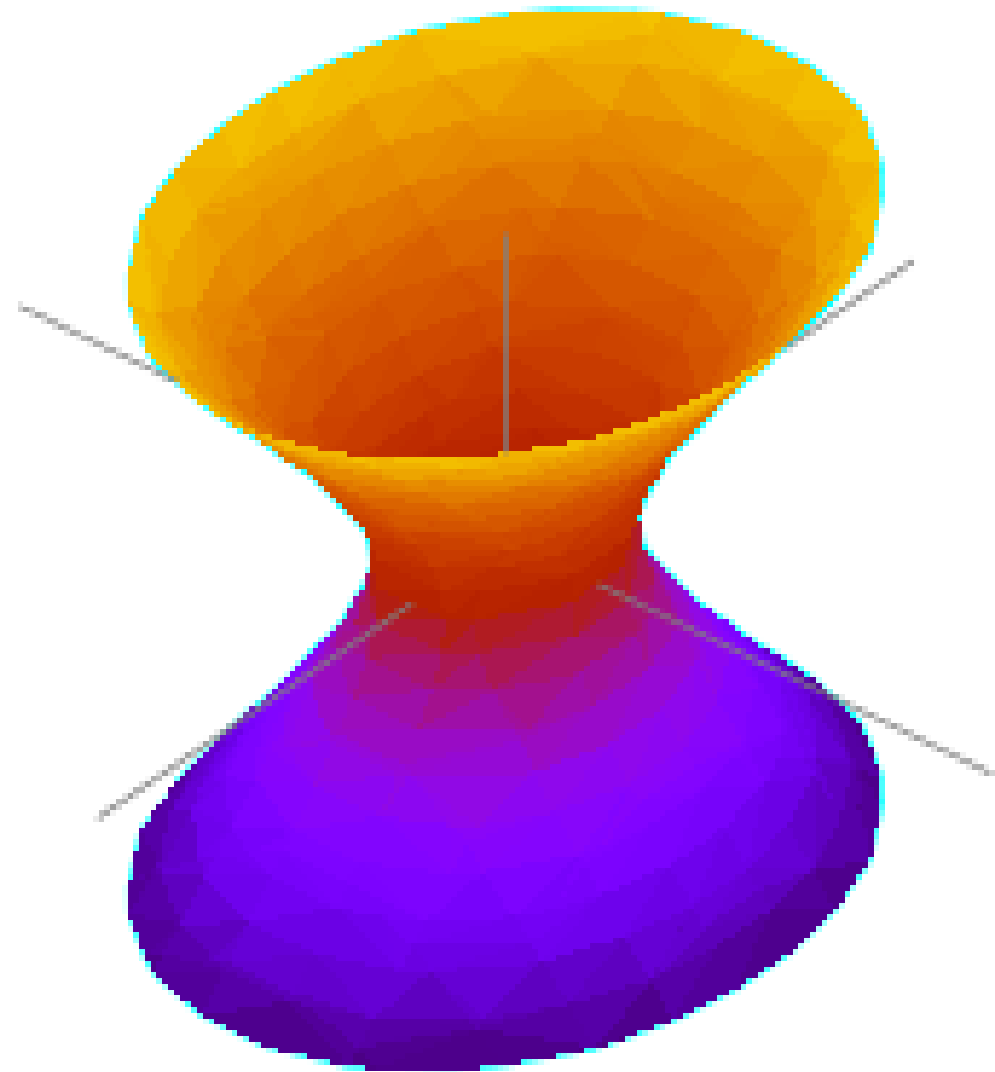


Рис. 4.42





$r = 0.0000$ ,  $s = 0.0000$ ,  $u_0 = -1.00$







- ***Владимир Григорьевич Шухов (V.G. Shukhov):***

- Born: 1853 in Грайворон (Belgorod region), near the present border between Ukraine and Russia; Died: 1939;
- Aristocratic and decent parents;
- Outstanding engineer: apart from architecture, contributed also to the construction of oil pipe-lines and storage (1878, in collaboration with the Nobel family), cracking (1931); military applications (maritime mines, artillery,...);
- Decorated with highest State awards; elected corresponding member of the Russian Academy of Sciences (1928).





## *Famous hyperboloids:*

- Nizhny Novgorod, May 28, 1896 (patent of the Russian Empire, #1896), 25.5 (37) m. high, 123 000 liters reservoir on the top; conserved, moved to Polibino, Lipeck (село Полибино, Липецкой обл.) ;
- Shukhov's (about 200) towers: Moscow (Shabolovka, 1919-1922, 150 m., Russia's highest construction by that time!), Oka river, Krasnodar, Konotop, Petushki, lighthouse in Kherson, Kievskij and Kazanskij railway stations in Moscow, GUM, high-voltage lines' supports, 128 m. high (in N. Novgorod), power stations' coolers, skyscrapers,... ;
- Russian, US and Argentina's ships; Kobe port tower, 108 m., Japan, resisted the 7 magnitude earthquake in 1995!; Sydney's TV tower; Guangzhou, 600 m. (China); the 318 m. Aspire tower (Doha, Qatar), with a swimming pool on its top; Oscar Nymaier (Brazil), Gaudi (Catalunia), Le Corbousier, Szekeres Gerő (Marosvásárhely),...





















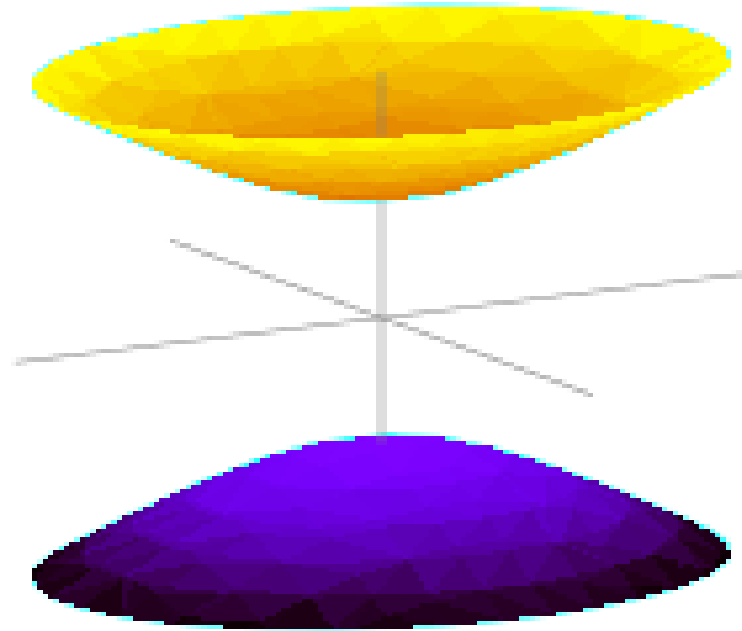






## *APPENDIX:*

Science fiction, thriller: novel (1925-1927), movie:  
*“Engineer Garin’s hyperboloid”, by A. Tolstoi*



- **A. Tolstoi (Алексей Николаевич Толстой):**

- Born in 1883 (Samara reg. ), died in Febr. 1945;
- Emigrated from Russia between 1918 – 1923 (Turkey, Paris, Germany);
- “Red count” («Красный граф»); prolific writer, bonvivant (married 4 times, 10 children, dozens of grand children); decorated by highest Soviet awards (e.g. 3 highest level Stalin awards (1941, 43 and 46 (post-h.), etc.);
- Buried at the Novodevichij monastery (pantheon), Moscow.



**•Thanks to:**

**•Máté Csanád, Tamás Csörgő, and Máté Novák!**

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Greek-Catholic Church  
in Reghin, Romania



Is it an ruled surfaces, (line surface), so its curvature is zero.  
A parabolic hyperboloid, which also has a zero curvature.  
designer: Gerő Szekeres (architect)



This is natural Euclidean “shape” embedded in the a 3-dimensional spaces. It has nothing to do with Bolyai-Lobachevsky's geometry.





They have already been created in Romanian architecture: The railway station Predal building. This is also a zero-curvature line surface.  
designer: Irina Rosetti (architect)



**Irina C. Rosetti** (n. [15 noiembrie 1941](#), România) este o [arhitectă](#) română ce trăiește la [Paris](#). S-a distins prin clădirile moderne industriale pe care le-a proiectat și construit în anii '70 în România.

