# On the Monte Carlo simulation of anisotropic Newtonian gravitation

S. Halayka*

Monday 11th August, 2025 13:49

**Abstract**

This paper contains a short introduction to anisotropic Newtonian gravitation. The main focus is on some C++ code.

## 1 Introduction

$$\alpha = \frac{\beta(R + \epsilon) - \beta(R)}{\epsilon}. \tag{1}$$

$$g = \frac{-\alpha}{r^2}. \tag{2}$$

$$a_N = \sqrt{\frac{nGc\hbar \log 2}{4k\pi R^4}}, \tag{3}$$

$$v_N = \sqrt{a_N R}. \tag{4}$$

$$v_{\text{flat}} = x v_N \tag{5}$$

where $x = 2$ for example.

$$a_{\text{flat}} = \frac{v_{\text{flat}}^2}{R} = \frac{gRc\hbar \log 2}{k2\pi M}. \tag{6}$$

$$g_N = \frac{a_N k2\pi M}{Rc\hbar \log 2}. \tag{7}$$

$$a_{\text{flat}} \propto g. \tag{8}$$

$$a_{\text{ratio}} = \frac{a_{\text{flat}}}{a_N}. \tag{9}$$

$$g_{\text{ratio}} = \frac{g}{g_N}. \tag{10}$$

$D$ is where $g_{\text{ratio}} \geq a_{\text{ratio}}$.

*sjhalayka@gmail.com

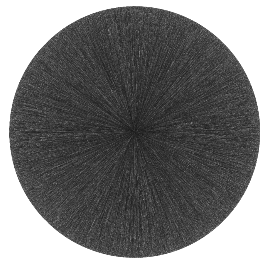

Figure 1: Where $D = 3$, as viewed from the side. The field lines are isotropic, spherical.

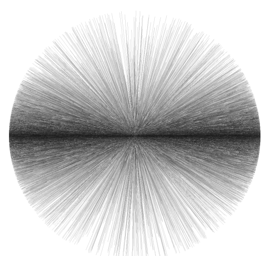

Figure 2: Where $D = 2.1$, as viewed from the side. The field lines are increasingly anisotropic.



Figure 3: Where $D = 2.001$, as viewed from the side. The field lines are anisotropic, disk-like.

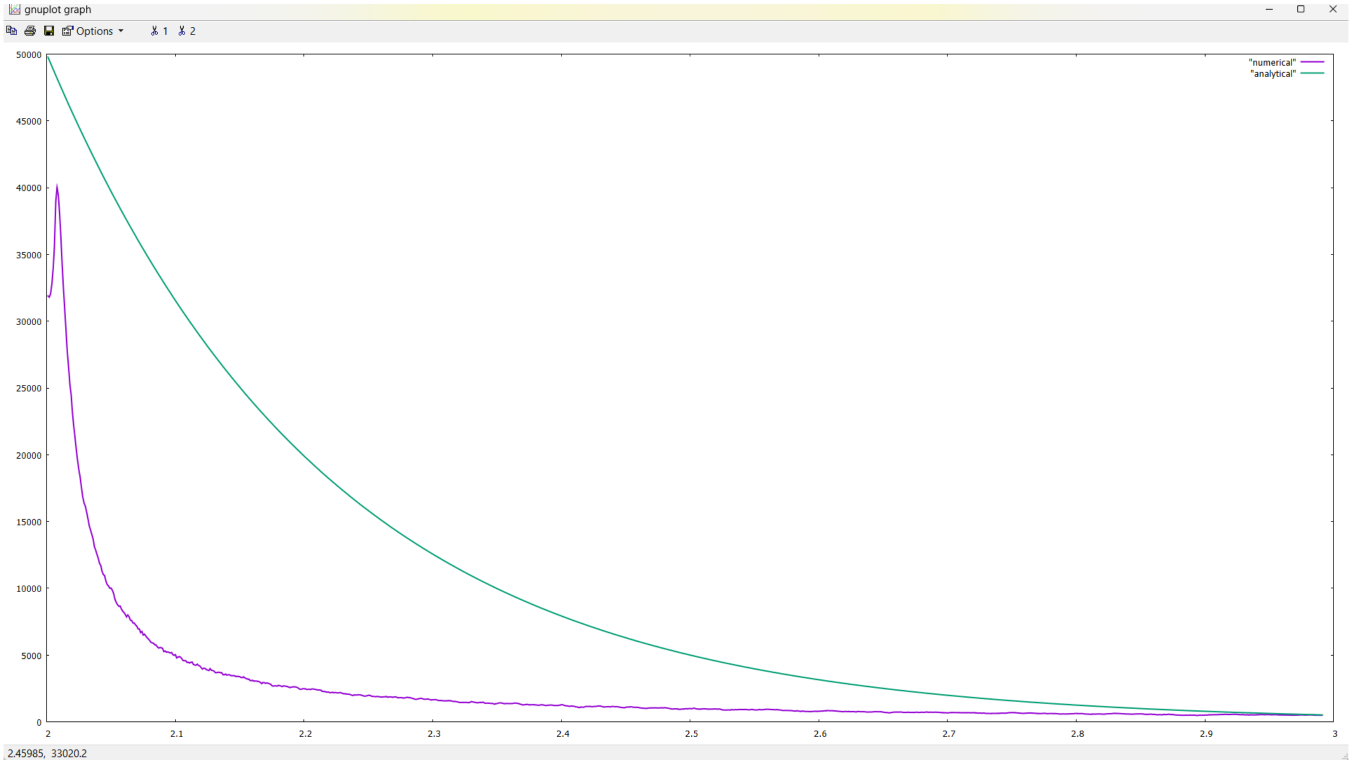


Figure 4: $R = 100$, $r = 1$, $n = 10^8$, $\epsilon = 1$.

# References

[1] Misner et al. Gravitation. (1970)

[2] ‘t Hooft. Dimensional reduction in quantum gravity. (1993)

[3] Susskind. The World as a Hologram. (1994)