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ОПИСАНИЕ ПОКОЛЕНИЙ НЕЙТРИНО В ПОДХОДЕ ТЕОРИИ РЕЛЯТИВИСТСКИХ ВОЛНОВЫХ УРАВНЕНИЙ

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$$\left(\Gamma_{\mu}\partial_{\mu} + m\right)\psi\left(x\right) = 0 \qquad [1]$$

$$\Gamma_4 = \oplus \sum_s C^s \otimes I_{2s+1}, \qquad [2]$$

$$m_k^{(s)} = \frac{m}{\left|\lambda_k^{(s)}\right|} \qquad [3]$$

$$l_1' = l_1 \pm \frac{1}{2}, \quad l_2' = l_2 \pm \frac{1}{2}, \qquad [4]$$

$$\left| l_1 - l_2 \right| \le s \le l_1 + l_2 \qquad [5]$$

$$L = -\bar{\psi}\left(\Gamma_{\mu}\partial_{\mu} + m\right)\psi, \qquad [6]$$

$$\bar{\psi}\psi = \psi^{+}\eta\psi, \qquad [7]$$

$$\eta = \oplus\sum_{s}\eta^{s}\otimes I_{2s+1}, \qquad [8]$$

$$\eta^{s}_{\tau\dot{\tau}} = \eta^{s}_{\dot{\tau}\tau} = -\eta^{s+1}_{\tau\dot{\tau}} \qquad [9]$$

$$
\begin{array}{ccc}
\left(0,\dfrac{1}{2}\right)' & — & \left(\dfrac{1}{2},0\right)' \\
| & & | \\
\left(\dfrac{1}{2},1\right) & — & \left(1,\dfrac{1}{2}\right) \\
| & & | \\
\left(0,\dfrac{1}{2}\right) & — & \left(\dfrac{1}{2},0\right)
\end{array}
\qquad [10]
$$

$$\Gamma_4 = \left(C^{1/2} \otimes I_2\right) \oplus \left(C^{3/2} \otimes I_4\right), \qquad [11]$$

$$\eta = \left(\eta^{1/2} \otimes I_2\right) \oplus \left(\eta^{3/2} \otimes I_4\right) \qquad [14]$$

$$C^{1/2}=\begin{pmatrix} 0 & c_1 & 0 & 0 & c_3 & 0 \\ c_1 & 0 & 0 & 0 & 0 & c_3 \\ 0 & 0 & 0 & c_2 & c_4 & 0 \\ 0 & 0 & c_2 & 0 & 0 & c_4 \\ fc_3^* & 0 & gc_4^* & 0 & 0 & 0 \\ 0 & fc_3^* & 0 & gc_4^* & 0 & 0 \end{pmatrix},\quad C^{3/2}=\begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}; \qquad [24]$$

$$f=\pm 1,\ g=\pm 1$$

$$\pm\lambda_1, \pm\lambda_2, \pm\lambda_3,$$

$$\mu_1 = \lambda_1^2, \mu_2 = \lambda_2^2, \mu_3 = \lambda_3^2,$$

$$\mu^3 - a\mu^2 + b\mu - d = 0$$

$$a = c_1^2 + c_2^2 + 2f\,|c_3|^2 + 2g\,|c_4|^2, \qquad [27]$$

$$b = c_1^2 c_2^2 + |c_3|^4 + |c_4|^4 + 2fc_2^2\,|c_3|^2 + \qquad [28]$$
$$+2gc_1^2\,|c_4|^2 + 2fg\,|c_3|^2\,|c_4|^2,$$

$$c = c_1^2\,|c_4|^4 + c_2^2\,|c_3|^4 + 2fgc_1c_2\,|c_3|^2\,|c_4|^2. \qquad [29]$$

$$m_1 = \frac{m}{\sqrt{\mu_1}}, \quad m_2 = \frac{m}{\sqrt{\mu_2}}, \quad m_3 = m; \qquad [43]$$

$$f = g = 1 \qquad [44]$$

$$c_1 = 1+\alpha, \quad c_2 = 1-\alpha, \quad |c_3| = \sqrt{\beta},$$
$$|c_4| = \sqrt{1-\beta} \quad (0<\beta<1);$$
[45]

$$\alpha = 0, \quad \beta \in (0,1);$$
[49]

$$\alpha^3 - \alpha\left(4\beta^2 - 4\beta + 3\right) - 4\beta + 2 = 0$$
[50]

$$\alpha_1 = -2\beta + 1, \quad \beta \in \left(0, \frac{1}{2}\right) \cup \left(\frac{1}{2}, 1\right); \qquad \textbf{[51]}$$

$$\alpha_2 = \frac{2\beta - 1 - \sqrt{4\beta^2 - 4\beta + 9}}{2}, \quad \beta \in \left(0, \frac{3-\sqrt{3}}{6}\right) \cup \left(\frac{3-\sqrt{3}}{6}, 1\right); \quad \textbf{[52]}$$

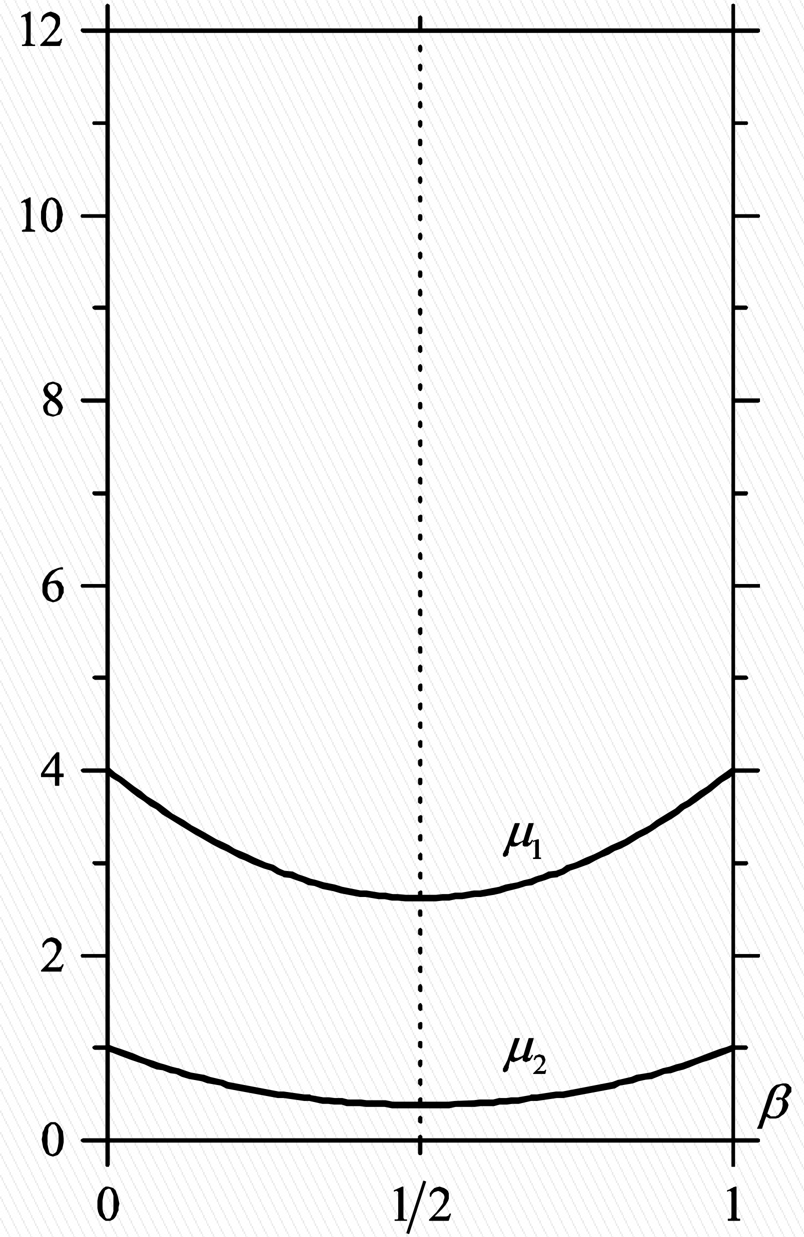
$$\alpha_3 = \frac{2\beta - 1 + \sqrt{4\beta^2 - 4\beta + 9}}{2}, \quad \beta \in \left(0, \frac{3+\sqrt{3}}{6}\right) \cup \left(\frac{3+\sqrt{3}}{6}, 1\right); \quad \textbf{[53]}$$

$$\mu_1 = \frac{3+\sqrt{5}}{2}, \quad \mu_2 = \frac{3-\sqrt{5}}{2} \quad (\alpha = 0)$$

[54]

$$\left(\alpha = \alpha_1\right)$$

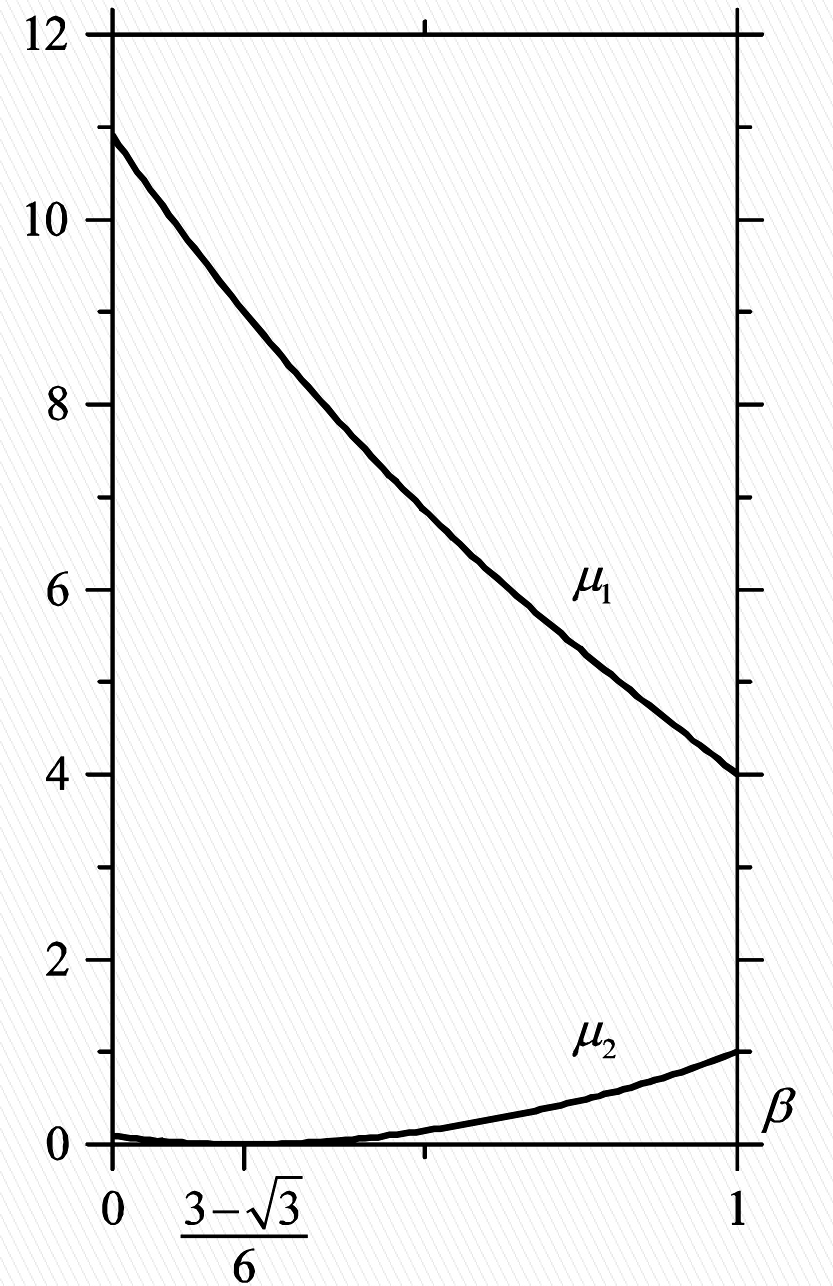
$$\left.\begin{aligned}\mu_1 &= 4\beta^2 - 4\beta + \frac{5+\sqrt{16\beta^2-16\beta+9}}{2}\\ \mu_2 &= 4\beta^2 - 4\beta + \frac{5-\sqrt{16\beta^2-16\beta+9}}{2}\end{aligned}\right\}$$



$$(\alpha = \alpha_2)$$

$$\left.\begin{aligned}\mu_1 &= 2\beta^2 - 2\beta - S\beta + \frac{S}{2} + 4 + \\ &+ \frac{3}{2}\sqrt{8\beta^2 - 8\beta - 4S\beta + 2S + 7}\\ \mu_2 &= 2\beta^2 - 2\beta - S\beta + \frac{S}{2} + 4 - \\ &- \frac{3}{2}\sqrt{8\beta^2 - 8\beta - 4S\beta + 2S + 7}\end{aligned}\right\},$$

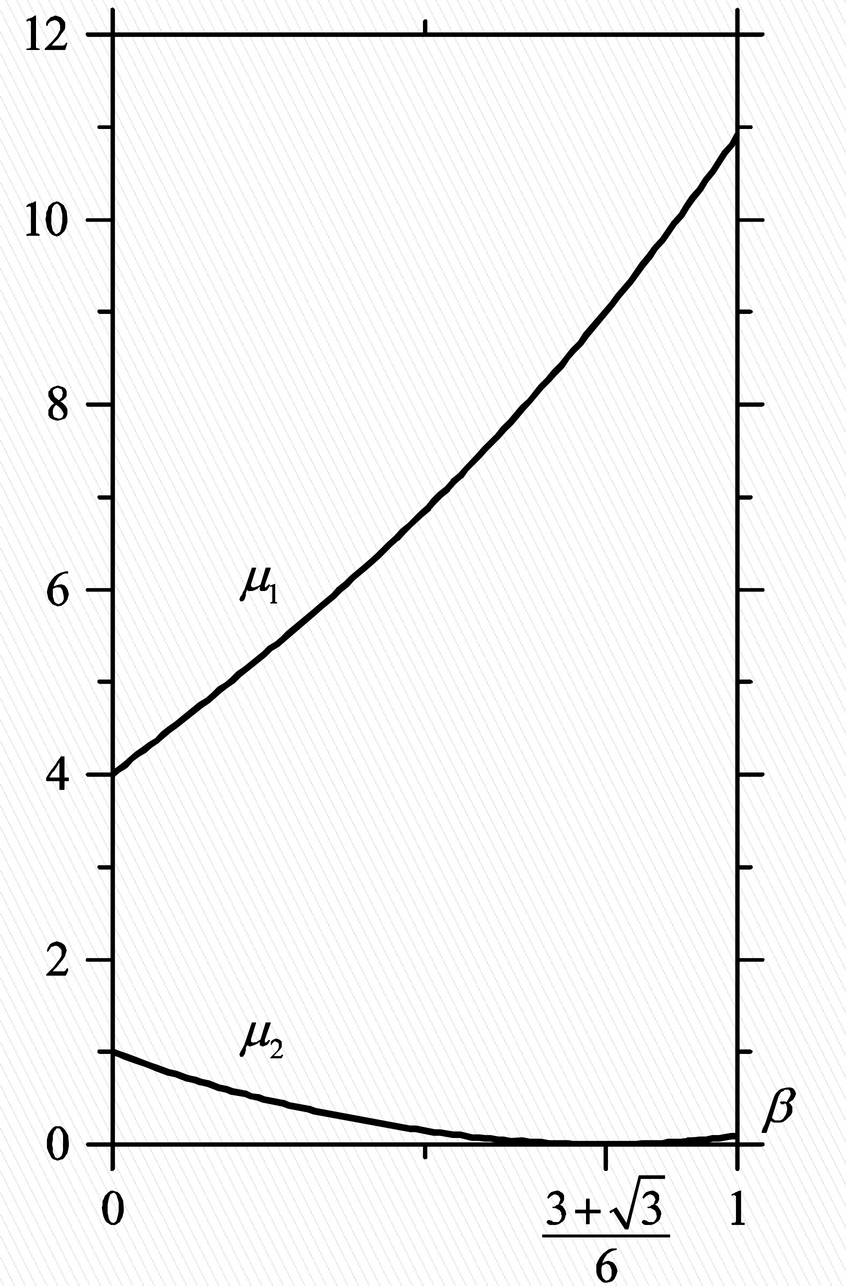
$$S = \sqrt{4\beta^2 - 4\beta + 9}$$

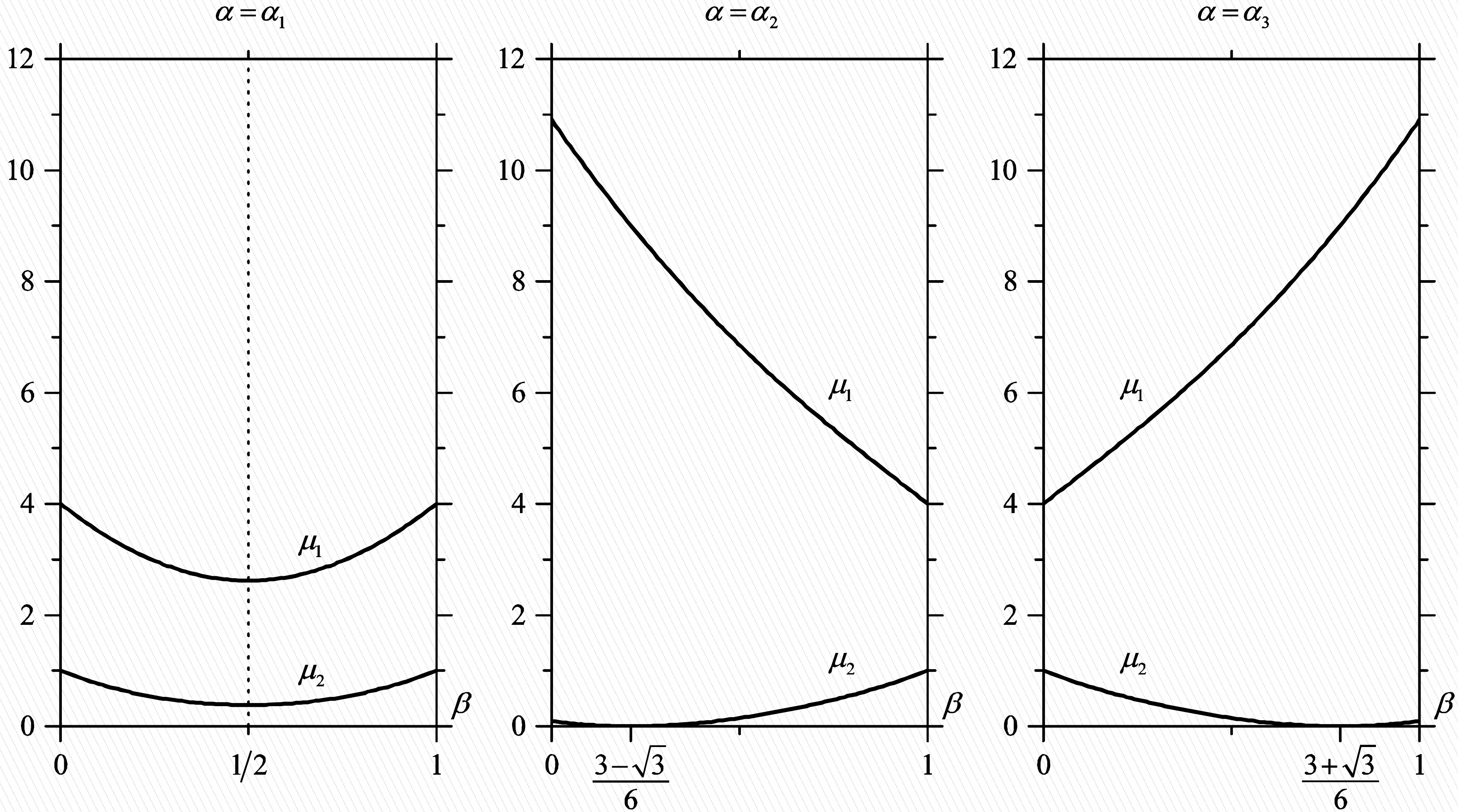


$$\left(\alpha = \alpha_3\right)$$

$$\left.\begin{aligned} \mu_1 &= 2\beta^2 - 2\beta + S\beta - \frac{S}{2} + 4 + \\ &+ \frac{3}{2}\sqrt{8\beta^2 - 8\beta + 4S\beta - 2S + 7} \\ \mu_2 &= 2\beta^2 - 2\beta + S\beta - \frac{S}{2} + 4 - \\ &- \frac{3}{2}\sqrt{8\beta^2 - 8\beta + 4S\beta - 2S + 7} \end{aligned}\right\},$$

$$S = \sqrt{4\beta^2 - 4\beta + 9}$$





Графики зависимости величин μ_1, μ_2 от параметра β

Спасибо за внимание!