$$\rho = 4\pi F \int_0^{\sqrt{2\psi}} \left(\psi - \tfrac{1}{2} v^2\right)^{m-3/2} v^2 \, dv$$

$v = 0 \rightarrow \cos\theta = 0 \quad \theta = \frac{\pi}{2}$ $\quad \sqrt{2\psi}$

$v = \sqrt{2\psi} \rightarrow \cos\theta = 1 \quad \theta = 0$

$v^2 = 2\psi \cos^2\theta$

$2v\,dv = -2\psi \, 2 \cos\theta \, \mathrm{sen}\,\theta \, d\theta = -4\psi \, \mathrm{sen}\,\theta \cos\theta \, d\theta$

$$v^2 dv = \frac{-2\psi \, \mathrm{sen}\,\theta \cos\theta \, d\theta}{v\,dv} \cdot \sqrt{2\psi}\cos\theta = -2\sqrt{2}\, \psi^{3/2} \, \mathrm{sen}\,\theta \cos^2\theta \, d\theta$$

$\sqrt{v2}$

$$\rho = 4\pi F \int_0^{\pi/2} (-)\left(\psi - \psi\cos^2\theta\right)^{m-3/2} (-2\sqrt{2})\, \psi^{3/2} \, \mathrm{sen}\,\theta \cos^2\theta \, d\theta = 4\pi F \int_0^{\pi/2} \psi^{m} (\mathrm{sen}\,\theta)^{2m-2} \cos^2\theta \, (+2\sqrt{2}) \, d\theta =$$

$$= 8\sqrt{2}\,\pi F \left[\int_0^{\pi/2} \psi^m (\mathrm{sen}^2\theta)^{2m-2} d\theta - \int \psi^m (\mathrm{sen}^2\theta)^{2m} d\theta \right] = C_m \psi^m$$

$$C_m = 8\sqrt{2}\,\pi F \left[\int^{\pi/2} (\mathrm{sen}^2\theta)^{2m-2} d\theta - \int (\mathrm{sen}^2\theta)^{2m} d\theta \right] =$$

$2^{7/2}$