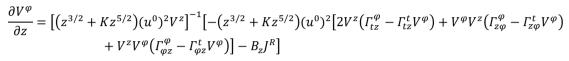
بیس بر ای جت خو اهیم داشت:

پایستگی جرم:

$$\begin{split} \frac{\partial V^z}{\partial z} &= \left(z^{3/2} + K z^{5/2}\right)^{-1} \left\{ -\left(z^{\frac{3}{2}} + K z^{\frac{5}{2}}\right) \left[-\left\{ \Gamma_{\varphi z}^0 V^z V^\varphi + \Gamma_{z\varphi}^0 V^\varphi V^z \right\} \right] - \frac{1}{(u^0)^2} \left[-2\{ -B_z J^R u^\varphi u^0 \} \right] \right. \\ &\left. - V^z \frac{\partial}{\partial z} \left(z^{3/2} - K z^{5/2}\right) \right\} \end{split}$$

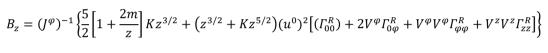


<mark>پایستگی تکانه زاویه ای</mark>:





<mark>ایستگی تکانه</mark> شعاعی نتیجه می دهد:





$$\begin{split} \frac{\partial V^z}{\partial z} &= \left[\left(z^{3/2} + K z^{5/2} \right) (u^0)^2 V^z \right]^{-1} \left\{ - \left[1 + \frac{2m}{z} \right] \frac{\partial (K z^{5/2})}{\partial z} \right. \\ & \left. - \left(z^{3/2} + K z^{5/2} \right) (u^0)^2 \left[\varGamma_{tt}^z + 2 V^\varphi \varGamma_{t\varphi}^z - 2 \varGamma_{tz}^t V^z V^z + V^\varphi V^\varphi \varGamma_{\varphi\varphi}^z - \varGamma_{z\varphi}^t V^z V^\varphi V^z - \varGamma_{\varphi z}^t V^z V^z V^\varphi V^z \right. \\ & \left. + V^z V^z \varGamma_{zz}^z \right] \right\} \end{split}$$

و ترکیب با پایستگی جرم (چون دوتا معادله برای $\frac{\partial V^z}{\partial z}$ به دست آمده) به این نتیجه می رسیم:



$$\begin{split} B_{\varphi} &= \left(-\frac{1}{4\pi} \bigg\{ \frac{\partial}{\partial z} \bigg[-\frac{z^2}{(z^2 + 2m)^2} \bigg] \right. \\ &\quad + \left(-\frac{mz(z + 2z^3 + z^5 - 2m + 6a^2m - 4mz^2 - 2mz^4)}{(1 - 4m^2 + 3z^2 + 4a^2m^2 - 8m^2z^2 + 3z^4 - 4m^2z^4 + z^6)} - \frac{m}{z(z + 2m)} \\ &\quad - \frac{mz}{(1 + z^2)(\sqrt{z} + 2m)} \right) \left(-\frac{z^2}{(z^2 + 2m)^2} \right) \bigg\}^{-1} \left(B_z u^{\varphi} u^0 \right)^{-1} \Bigg[-\frac{(u^0)^2}{2} \bigg\{ \bigg(z^{\frac{3}{2}} + Kz^{\frac{5}{2}} \bigg) \bigg[- \bigg\{ \Gamma_{\varphi z}^0 V^z V^{\varphi} + \Gamma_{z\varphi}^0 V^{\varphi} V^z \bigg\} \bigg] + V^z \frac{\partial}{\partial z} \bigg(z^{\frac{3}{2}} - Kz^{\frac{5}{2}} \bigg) \bigg\} \\ &\quad - \frac{\left(z^{\frac{3}{2}} + Kz^{\frac{5}{2}} \right)}{2 \left(z^{\frac{3}{2}} + Kz^{\frac{5}{2}} \right) V^z} \left\{ - \left[1 + \frac{2m}{z} \right] \frac{\partial (Kz^{5/2})}{\partial z} \\ &\quad - \left(z^{3/2} + Kz^{5/2} \right) (u^0)^2 \big[\Gamma_{tt}^z + 2V^{\varphi} \Gamma_{t\varphi}^z - 2\Gamma_{tz}^t V^z V^z + V^{\varphi} V^{\varphi} \Gamma_{\varphi\varphi}^z - \Gamma_{z\varphi}^t V^z V^{\varphi} V^z - \Gamma_{\varphi z}^t V^z V^z V^{\varphi} V^z + V^z V^z V^z V^z V^z V^{\varphi} \bigg\} \bigg\} \end{split}$$

حالا مشکل اینجاست که برای مولفه های B رابطه مشتقی نداریم!

معادلات نهایی قرص و جت نیازمند حل عددی

همینطور برای J در جت داریم (تنها آن هایی که استفاده دارند را نوشتیم) :

$$\begin{split} -\frac{4\pi}{c}J^R &= B_{\varphi}\left\{\frac{\partial}{\partial z}\left[-\frac{z^2}{(z^2+2m)^2}\right] \right. \\ &+ \left(-\frac{mz(z+2z^3+z^5-2m+6a^2m-4mz^2-2mz^4)}{(1-4m^2+3z^2+4a^2m^2-8m^2z^2+3z^4-4m^2z^4+z^6)} - \frac{m}{z(z+2m)} \right. \\ &- \frac{mz}{(1+z^2)(\sqrt{z}+2m)}\right) \left(-\frac{z^2}{(z^2+2m)^2}\right) \right\} \\ -\frac{4\pi}{c}J^{\varphi} &= -B_z\left\{\frac{am(z-2z^3+4mz^2)}{(1-4m^2+3z^2+4a^2m^2-8m^2z^2+3z^4-4m^2z^4+z^6)} \left(\frac{z^4}{2ma(z+2m)}\right) \right. \\ &+ \left. \left(-\frac{m}{z^2(z+2m)} - (2mz^3+4z^5m+2z^7m-mz-4z^3m-5z^5m-2z^7m-1z^2+2m^2z^2+2a^2m^2+8m^2z^2-6z^4-4a^2m^2z^2+10m^2z^4-4z^6+4m^2z^6-z^8)/((1+z^2)(1-4m^2+3z^2+4a^2m^2-8m^2z^2+3z^4-4m^2z^4+z^6)) \right. \\ &- \frac{m}{(1+z^2)(z+2m)} \left(\frac{z^2}{(z+2m)^2}\right) \right\} \end{split}$$