Vektorielle Hauptgleichungen der Weber-Kraft-Dynamik

1 Vektordefinitionen (Kartesische Koordinaten)

Ortsvektor

$$\vec{r} = \begin{pmatrix} x \\ y \\ z \end{pmatrix} = r \begin{pmatrix} \sin\theta\cos\phi \\ \sin\theta\sin\phi \\ \cos\theta \end{pmatrix} \tag{1}$$

Geschwindigkeitsvektor

$$\vec{v} = \dot{\vec{r}} = \begin{pmatrix} \dot{x} \\ \dot{y} \\ \dot{z} \end{pmatrix} = \dot{r}\hat{r} + r\dot{\theta}\hat{\theta} + r\sin\theta\dot{\phi}\hat{\phi} \tag{2}$$

Beschleunigungsvektor

$$\begin{aligned} \vec{a} = \ddot{\vec{r}} &= \begin{pmatrix} \ddot{x} \\ \ddot{y} \\ \ddot{z} \end{pmatrix} \\ &= \left(\ddot{r} - r\dot{\theta}^2 - r\sin^2\theta\dot{\phi}^2\right)\hat{r} \\ &+ \left(r\ddot{\theta} + 2\dot{r}\dot{\theta} - r\sin\theta\cos\theta\dot{\phi}^2\right)\hat{\theta} \\ &+ \left(r\sin\theta\ddot{\phi} + 2\dot{r}\sin\theta\dot{\phi} + 2r\cos\theta\dot{\theta}\dot{\phi}\right)\hat{\phi} \end{aligned} \tag{3}$$

2 Lösungen in Vektorform

Bahngleichung (xy-Ebene)

$$\vec{r}(\phi) = \frac{a(1-e^2)}{1+e\cos(\kappa\phi)}\left[1 + \frac{3G^2M^2}{c^2h^4}\left(1 + \frac{e^2}{2} + e\phi\sin(\kappa\phi)\right)\right]\begin{pmatrix} \cos\phi \\ \sin\phi \\ 0 \end{pmatrix} \tag{4}$$

Geschwindigkeitsfeld

$$\vec{v}(\phi) = \sqrt{\frac{GM}{a(1-e^2)}}\left[\frac{e\kappa\sin(\kappa\phi)}{1+e\cos(\kappa\phi)}\begin{pmatrix} \cos\phi \\ \sin\phi \\ 0 \end{pmatrix} + (1+e\cos(\kappa\phi))\begin{pmatrix} -\sin\phi \\ \cos\phi \\ 0 \end{pmatrix}\right] \tag{5}$$