

The dependence of Euler angles $(\varphi_1, \Phi_0, \varphi_2)$ on $(\Phi, \beta; \Psi, \gamma; \omega)$ for $\mathbf{h} \parallel \mathbf{y}$

(The terms were grouped to have minimal error by difference)

$$\cos \Phi'_0 = \cos(\Psi - \Phi) - 2 \sin \Psi \sin \Phi \sin^2(\omega/2)$$

$$\sin \varphi'_1 \sin \Phi'_0 = \cos \gamma [\sin(\Psi - \Phi) + 2 \sin \Phi \cos \Psi \sin^2(\omega/2)] + \sin \gamma \sin \Phi \sin \omega$$

$$-\cos \varphi'_1 \sin \Phi'_0 = \sin \gamma [\sin(\Psi - \Phi) + 2 \sin \Phi \cos \Psi \sin^2(\omega/2)] - \cos \gamma \sin \Phi \sin \omega$$

$$\sin \varphi'_2 \sin \Phi'_0 = \cos \beta [\sin(\Phi - \Psi) + 2 \sin \Psi \cos \Phi \sin^2(\omega/2)] - \sin \beta \sin \Psi \sin \omega$$

$$\cos \varphi'_2 \sin \Phi'_0 = \sin \beta [\sin(\Phi - \Psi) + 2 \sin \Psi \cos \Phi \sin^2(\omega/2)] + \cos \beta \sin \Psi \sin \omega$$