1 Vorwärtsproblem

$$\begin{split} h_r &= \sqrt{l_e^2 + h_m^2 - 2l_e h_m \cdot cos(\phi)} \\ \alpha &= \arcsin\left(l_e \cdot \frac{sin(\phi)}{h_r}\right) \\ \beta &= \pi - \alpha - \psi \\ h &= \sin(\phi) \cdot \frac{h_b}{sin(\beta)} \\ \gamma &= \arcsin(\frac{l_r}{h_r}) \\ \delta &= \pi - \beta - \gamma \\ b_{bottom} &= \frac{sin(\gamma)}{sin(\delta)} \cdot h \\ \epsilon &= \pi - \beta \\ \zeta &= \pi - \epsilon - \gamma \\ b_{top} &= \frac{sin(\epsilon)}{sin(\zeta)} \cdot h \\ b &= b_{top} + b_{bottom} \end{split}$$

$$b(l_r, l_e, h_m, h_b, \phi, \psi) = \frac{\sin\left(\arcsin\left(\frac{l_r}{\sqrt{l_e^2 + h_m^2 - 2*l_e*h_m*cos(\phi)}}\right) + \psi\right)}{\sin(-\arcsin\left(\frac{l_r}{\sqrt{l_e^2 + h_m^2 - 2*l_e*h_m*cos(\phi)}}\right) + \pi - \arcsin\left(\frac{l_e*sin(\phi)}{\sqrt{l_e^2 + h_m^2 - 2*l_e*h_m*cos(\phi)}}\right) - \psi\right)} + \frac{\frac{l_e*sin(\phi)}{h_r} + \psi}{\sin(-\arcsin\left(\frac{l_r}{\sqrt{l_e^2 + h_m^2 - 2*l_e*h_m*cos(\phi)}}\right) + \arcsin\left(\frac{l_e*sin(\phi)}{\sqrt{l_e^2 + h_m^2 - 2*l_e*h_m*cos(\phi)}}\right) + \psi\right)} \cdot \left(\frac{\sin(\phi) * h_b}{\sin(\pi - \arcsin\left(\frac{l_e*sin(\phi)}{\sqrt{l_e^2 + h_m^2 - 2*l_e*h_m*cos(\phi)}}\right) - \psi\right)}\right)$$