

$$\begin{aligned}
x_2 &= x_1 + y_1^2 \left(1 - \frac{y_1^2}{12\rho_b^2}\right) \frac{p_1^2}{2\rho_b(p_1^2 - p_{x1}^2)^{3/2}} , \\
p_{y2} &= p_{y1} - p_{x1} \left(1 - \frac{y_1^2}{6\rho_b^2}\right) \frac{y_1}{p_1 \rho_b \sqrt{p_1^2 - p_{x1}^2}} , \\
z_2 &= z_1 - p_{x1} y_1^2 \left(1 - \frac{y_1^2}{12\rho_b^2}\right) \frac{p_1}{2\rho_b(p_1^2 - p_{x1}^2)^{3/2}} .
\end{aligned} \tag{96}$$