Numerical method of solution of equations (11) and (12).

To solve equations (11) and (12) numerically we first recast them in a modified form. We start with:

$$t_L + 1 = \frac{t_L\left(t_1 + 1\right)\left(f^2 + t_R^2 - t_L^2\right)}{\alpha\, f\sqrt{2\left(t_L^{\,2} + t_R^{\,2}\right)f^2 - \left(t_R^{\,2} - t_L^{\,2}\right)^2 - f^4}} \qquad \text{(B1)}$$

[equation (11) of paper]

$$t_R + 1 = \frac{t_R\left(t_1 + 1\right)(f^2 + t_L^2 - t_R^2)}{(1-\alpha)\, f\sqrt{2\left(t_L^{\,2} + t_R^{\,2}\right)f^2 - \left(t_R^{\,2} - t_L^{\,2}\right)^2 - f^4}} \qquad \text{(B2)}$$

[equation (12) of paper]

Now defining $\beta = t_{\mathbf{L}}^{\mathbf{2}} - t_{\mathbf{R}}^{\mathbf{2}}$ we rewrite (B1) and (B2) as

$$t_L + 1 = \frac{t_L\left(t_1 + 1\right)\left(f^2 - \beta\right)}{\alpha f\sqrt{2\left(2t_L^{\,2} - \beta\right)f^2 - \beta^2 - f^4}} \qquad \text{(B3)}$$

$$t_R + 1 = \frac{t_R\left(t_1 + \mathbf{1}\right)(f^2 + \beta)}{(1-\alpha)F\sqrt{2\left(2t_R^{\,2} + \beta\right)f^2 - \beta^2 - f^4}} \qquad \text{(B4)}$$

Equation (B3) now depends on t_L and β while equation (B4) depends on t_R and β and only one variable, β, links (B3) and (B4).

To solve (B3) and (B4) for t_L and t_R, the quantities f, t_1 and α are first fixed. A value of β is now selected. (B3) is solved to find t_L^{cal} ('cal' indicates a calculated value), and (B4) is solved for t_R^{cal} for this same value of β. The quantity $\beta^{cal} = \left(t_L^{cal}\right)^2 - \left(t_R^{cal}\right)^2$ is then calculated for this selected value of β. Finally the quantity $\left[\beta - \beta^{cal}\right]^2$ is calculated. The quantity $\left[\beta - \beta^{cal}\right]^2$ is then minimized by varying β and repeating the above process, an exact solution should give zero for $\left[\beta - \beta^{cal}\right]^2$. The solutions for t_L and t_R are those values of t_L^{cal} and t_R^{cal} obtained at the end of this minimization.

Once t_L and t_R are determined, the quantities y and d are determined from

$$\frac{y}{L_1} = \frac{\left(f^2 + t_R^2 - t_L^2\right)\left(f^2 - t_R^2 + t_L^2\right)}{2f^2\sqrt{2\left(t_L{}^2 + t_R{}^2\right)f^2 - \left(t_R{}^2 - t_L{}^2\right)^2 - f^4}}$$

[equation (9) of paper in reduced form]

and

$$\frac{d}{L_1} = \frac{f^2 + t_R{}^2 - t_L{}^2}{2f^2}$$

[equation (8) of paper in reduced form]

and the angles θ_L and θ_R are calculated from these values of y and d. Finally d_{shift} is calculated from $d_{shift}/L_1 = (d - c)/L_1$.

The above calculation is repeated for selected values of α between 0 and 0.5. Then symmetry may then be used to extract the values of t_L, t_R, θ_L, θ_R , y/L_1 and d_{shift}/L_1 between 0.5 and 1 using:

$$\begin{aligned}
t_L(\alpha) &= t_R(1-\alpha) \\
t_R(\alpha) &= t_L(1-\alpha) \\
\theta_R(\alpha) &= \theta_L(1-\alpha) \\
\theta_L(\alpha) &= \theta_R(1-\alpha) \\
y(\alpha) &= y(1-\alpha) \\
d_{\mathbf{shift}}(\alpha) &= -d_{\mathbf{shift}}(1-\alpha)
\end{aligned}$$

(The α in brackets denotes the functional dependence)