The transformation of a `DODECA` is given as

$$\exp(: F_{\text{in}} :) \exp(: a\text{L} :) \exp(: H_5/2 :) \exp(: b\text{L} :)$$
$$\times \exp(: V_5 :) \exp(: a\text{L} :) \exp(: H_5/2 :) \exp(: b\text{L} :) \exp(: F_{\text{out}} :), \tag{110}$$

where L and H_5 are the Hamiltonians of a drift of length L and a thin dodecapole kick with integrated strength K5:

$$H_5 = \frac{\text{K5}}{6!} \Re(x - iy)^6, \tag{111}$$

respectively. The coeffients are $a \equiv 1/2 - 1/\sqrt{12}$ and $b = 1/2 - a$. Terms $\exp(: F_{\text{in}} :)$ and $\exp(: F_{\text{out}} :)$ are transformations for entrance and exit nonlinear fringes. The term $\exp(: V_5 :)$ is a correction to adjust the third-order terms in L:

$$V_5 = \sum_{j=(x,y),k=(x,y)} -\frac{\beta}{2} H_{5,k}^2 + \gamma H_{5,j} H_{5,k} H_{5,jk}, \tag{112}$$

where , i represents the derivative by x or y. We have also introduced two coefficients $\beta \equiv 1/6 - 1/\sqrt{48}$ and $\gamma = 1/40 - 1/(24\sqrt{3})$.