$$
\begin{aligned}
I \frac{d^2}{dt^2}\begin{pmatrix}\theta_{\mathrm{H}}\\ \theta_{\mathrm{S}}\end{pmatrix} &= \begin{pmatrix} k_{\mathrm{H}} & 0 \\ 0 & k_{\mathrm{S}}\end{pmatrix}\begin{pmatrix}\theta_{\mathrm{H}}\\ \theta_{\mathrm{S}}\end{pmatrix} \\
&= k_{\mathrm{rp}}\begin{pmatrix} t_- & 0 \\ 0 & t_+\end{pmatrix}\begin{pmatrix}\theta_{\mathrm{H}}\\ \theta_{\mathrm{S}}\end{pmatrix}
\end{aligned}
$$

$$
k_{\mathrm{rp}} \equiv -\frac{2P}{c}\mathcal{L} = -\frac{2\,P\,L}{c\,(1-g_1 g_2)}
$$

$$
\begin{aligned}
t_\pm &= \frac{(g_1+g_2) \pm \sqrt{(g_1+g_2)^2 - 4\,(g_1 g_2 - 1)}}{2} \\
&= \frac{(g_1+g_2) \pm \sqrt{(g_1-g_2)^2 + 4}}{2}
\end{aligned}
$$

		$g_1 = g_2 =$ +sqrt(1/3)	$g_1 = g_2 =$ -sqrt(1/3)
L = 3000 m, P = 420 kW	k_{rp}	-12.609	-12.609
	t_-	- 0.42	+ 1.58
	k_H	+ 5.296	-19.922
	t_+	+ 1.58	- 0.42
	k_s	-19.922	+ 5.296
I = 0.173 kg m^2	f_H	0.88 Hz	1.71i Hz
	f_s	0.88i Hz	1.71 Hz