PSALTer results panel

Wave operator and propagator

	$1^+_{\cdot\cdot}\sigma^{\parallel}{}_{\alpha\beta}$	$1^+_{\cdot\cdot}\sigma^{\perp}{}_{\alpha\beta}$	$1^+_{\cdot\cdot}\tau^{\parallel}{}_{\alpha\beta}$	$1^-_{\cdot\cdot}\sigma^{\parallel}{}_{\alpha}$	$1^-_{\cdot\cdot}\sigma^{\perp}{}_{\alpha}$	$1^-_{\cdot\cdot}\tau^{\parallel}{}_{\alpha}$	$1^-_{\cdot\cdot}\tau^{\perp}{}_{\alpha}$
$1^+_{\cdot\cdot}\sigma^{\parallel}{}^{\alpha\beta}$	0	$-\frac{2\sqrt{2}}{(1+k^2)(8\beta_1-(\mathcal{M}_{\rm Pl}^2))}$	$-\frac{2i\sqrt{2}k}{(1+k^2)(8\beta_1-(\mathcal{M}_{\rm Pl}^2))}$	0	0	0	0
$1^+_{\cdot\cdot}\sigma^{\perp}{}^{\alpha\beta}$	$-\frac{2\sqrt{2}}{(1+k^2)(8\beta_1-(\mathcal{M}_{\rm Pl}^2))}$	$-\frac{2(-8\beta_1+(\mathcal{M}_{\rm Pl}^2)+2k^2\theta^2\xi)}{(1+k^2)^2(-8\beta_1+(\mathcal{M}_{\rm Pl}^2))^2}$	$-\frac{2ik(-8\beta_1+(\mathcal{M}_{\rm Pl}^2)+2k^2\theta^2\xi)}{(1+k^2)^2(-8\beta_1+(\mathcal{M}_{\rm Pl}^2))^2}$	0	0	0	0
$1^+_{\cdot\cdot}\tau^{\parallel}{}^{\alpha\beta}$	$\frac{2ik\sqrt{2}}{(1+k^2)(8\beta_1-(\mathcal{M}_{\rm Pl}^2))}$	$\frac{2ik(-8\beta_1+(\mathcal{M}_{\rm Pl}^2)+2k^2\theta^2\xi)}{(1+k^2)^2(-8\beta_1+(\mathcal{M}_{\rm Pl}^2))^2}$	$-\frac{2k^2(-8\beta_1+(\mathcal{M}_{\rm Pl}^2)+2k^2\theta^2\xi)}{(1+k^2)^2(-8\beta_1+(\mathcal{M}_{\rm Pl}^2))^2}$	0	0	0	0
$1^-_{\cdot\cdot}\sigma^{\parallel}{}^{\alpha}$	0	0	0	$\frac{4(72(4\beta_1+\beta_3)+k^2\xi)}{3(24(8\beta_1-(\mathcal{M}_{\rm Pl}^2))(4\beta_1+3\beta_3+(\mathcal{M}_{\rm Pl}^2))+k^2(8(\beta_1+8\beta_1\theta+6(4\beta_1+\beta_3)\theta^2)-(1+8\theta)(\mathcal{M}_{\rm Pl}^2))\xi)}$	$\frac{4\sqrt{2}(72\beta_3+36(\mathcal{M}_{\rm Pl}^2)+k^2(1+6\theta)\xi)}{3(1+2k^2)(24(8\beta_1-(\mathcal{M}_{\rm Pl}^2))(4\beta_1+3\beta_3+(\mathcal{M}_{\rm Pl}^2))+k^2(8(\beta_1+8\beta_1\theta+6(4\beta_1+\beta_3)\theta^2)-(1+8\theta)(\mathcal{M}_{\rm Pl}^2))\xi)}$	0	$\frac{8ik(72\beta_3+36(\mathcal{M}_{\rm Pl}^2)+k^2(1+6\theta)\xi)}{3(1+2k^2)(24(8\beta_1-(\mathcal{M}_{\rm Pl}^2))(4\beta_1+3\beta_3+(\mathcal{M}_{\rm Pl}^2))+k^2(8(\beta_1+8\beta_1\theta+6(4\beta_1+\beta_3)\theta^2)-(1+8\theta)(\mathcal{M}_{\rm Pl}^2))\xi)}$
$1^-_{\cdot\cdot}\sigma^{\perp}{}^{\alpha}$	0	0	0	$\frac{4\sqrt{2}(72\beta_3+36(\mathcal{M}_{\rm Pl}^2)+k^2(1+6\theta)\xi)}{3(1+2k^2)(24(8\beta_1-(\mathcal{M}_{\rm Pl}^2))(4\beta_1+3\beta_3+(\mathcal{M}_{\rm Pl}^2))+k^2(8(\beta_1+8\beta_1\theta+6(4\beta_1+\beta_3)\theta^2)-(1+8\theta)(\mathcal{M}_{\rm Pl}^2))\xi)}$	$\frac{8(18(8\beta_1+4\beta_3+(\mathcal{M}_{\rm Pl}^2))+(k+6k\theta^2\xi)}{3(1+2k^2)^2(24(8\beta_1-(\mathcal{M}_{\rm Pl}^2))(4\beta_1+3\beta_3+(\mathcal{M}_{\rm Pl}^2))+k^2(8(\beta_1+8\beta_1\theta+6(4\beta_1+\beta_3)\theta^2)-(1+8\theta)(\mathcal{M}_{\rm Pl}^2))\xi)}$	0	$\frac{8ik\sqrt{2}(18(8\beta_1+4\beta_3+(\mathcal{M}_{\rm Pl}^2))+(k+6k\theta^2\xi)}{3(1+2k^2)^2(24(8\beta_1-(\mathcal{M}_{\rm Pl}^2))(4\beta_1+3\beta_3+(\mathcal{M}_{\rm Pl}^2))+k^2(8(\beta_1+8\beta_1\theta+6(4\beta_1+\beta_3)\theta^2)-(1+8\theta)(\mathcal{M}_{\rm Pl}^2))\xi)}$
$1^-_{\cdot\cdot}\tau^{\parallel}{}^{\alpha}$	0	0	0	0	0	0	0
$1^-_{\cdot\cdot}\tau^{\perp}{}^{\alpha}$	0	0	0	$-\frac{8ik(72\beta_3+36(\mathcal{M}_{\rm Pl}^2)+k^2(1+6\theta)\xi)}{3(1+2k^2)(24(8\beta_1-(\mathcal{M}_{\rm Pl}^2))(4\beta_1+3\beta_3+(\mathcal{M}_{\rm Pl}^2))+k^2(8(\beta_1+8\beta_1\theta+6(4\beta_1+\beta_3)\theta^2)-(1+8\theta)(\mathcal{M}_{\rm Pl}^2))\xi)}$	$-\frac{8ik\sqrt{2}(18(8\beta_1+4\beta_3+(\mathcal{M}_{\rm Pl}^2))+(k+6k\theta^2\xi)}{3(1+2k^2)^2(24(8\beta_1-(\mathcal{M}_{\rm Pl}^2))(4\beta_1+3\beta_3+(\mathcal{M}_{\rm Pl}^2))+k^2(8(\beta_1+8\beta_1\theta+6(4\beta_1+\beta_3)\theta^2)-(1+8\theta)(\mathcal{M}_{\rm Pl}^2))\xi)}$	0	$\frac{288k^2(8\beta_1+4\beta_3+(\mathcal{M}_{\rm Pl}^2))+16k^4(1+6\theta)^2\xi}{3(1+2k^2)^2(24(8\beta_1-(\mathcal{M}_{\rm Pl}^2))(4\beta_1+3\beta_3+(\mathcal{M}_{\rm Pl}^2))+k^2(8(\beta_1+8\beta_1\theta+6(4\beta_1+\beta_3)\theta^2)-(1+8\theta)(\mathcal{M}_{\rm Pl}^2))\xi)}$

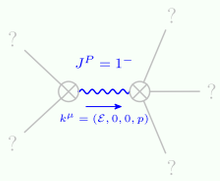
	$1^+_{\cdot\cdot}\mathcal{A}^{\parallel}{}_{\alpha\beta}$	$1^+_{\cdot\cdot}\mathcal{A}^{\perp}{}_{\alpha\beta}$	$1^+_{\cdot\cdot}f^{\parallel}{}_{\alpha\beta}$	$1^-_{\cdot\cdot}\mathcal{A}^{\parallel}{}_{\alpha}$	$1^-_{\cdot\cdot}\mathcal{A}^{\perp}{}_{\alpha}$	$1^-_{\cdot\cdot}f^{\parallel}{}_{\alpha}$	$1^-_{\cdot\cdot}f^{\perp}{}_{\alpha}$
$1^+_{\cdot\cdot}\mathcal{A}^{\parallel}{}^{\alpha\beta}$	$\frac{1}{4}(-8\beta_1+(\mathcal{M}_{\rm Pl}^2)+2k^2\theta^2\xi)$	$\frac{-8\beta_1+(\mathcal{M}_{\rm Pl}^2)}{2\sqrt{2}}$	$\frac{ik(8\beta_1-(\mathcal{M}_{\rm Pl}^2))}{2\sqrt{2}}$	0	$0\quad 0$		0
$1^+_{\cdot\cdot}\mathcal{A}^{\perp}{}^{\alpha\beta}$	$\frac{-8\beta_1+(\mathcal{M}_{\rm Pl}^2)}{2\sqrt{2}}$	0	0	0	$0\quad 0$		0
$1^+_{\cdot\cdot}f^{\parallel}{}^{\alpha\beta}$	$\frac{ik(8\beta_1-(\mathcal{M}_{\rm Pl}^2))}{2\sqrt{2}}$	0	0	0	$0\quad 0$		0
$1^-_{\cdot\cdot}\mathcal{A}^{\parallel}{}^{\alpha}$	$0\quad 0$		0	$2\beta_1+\beta_3+\frac{(\mathcal{M}_{\rm Pl}^2)}{4}+\frac{1}{72}(k+6k\theta^2\xi$	$-\frac{72\beta_3+36(\mathcal{M}_{\rm Pl}^2)+k^2(1+6\theta)\xi}{72\sqrt{2}}$	0	$-\frac{1}{72}ik(72\beta_3+36(\mathcal{M}_{\rm Pl}^2)+k^2(1+6\theta)\xi)$
$1^-_{\cdot\cdot}\mathcal{A}^{\perp}{}^{\alpha}$	$0\quad 0$		0	$-\frac{72\beta_3+36(\mathcal{M}_{\rm Pl}^2)+k^2(1+6\theta)\xi}{72\sqrt{2}}$	$2\beta_1+\frac{\beta_3}{2}+\frac{k^2\xi}{144}$	0	$\frac{ik(72(4\beta_1+\beta_3)+k^2\xi)}{72\sqrt{2}}$
$1^-_{\cdot\cdot}f^{\parallel}{}^{\alpha}$	$0\quad 0$		0	0	$0\quad 0$		0
$1^-_{\cdot\cdot}f^{\perp}{}^{\alpha}$	$0\quad 0$		0	$\frac{1}{72}ik(72\beta_3+36(\mathcal{M}_{\rm Pl}^2)+k^2(1+6\theta)\xi)$	$-\frac{ik(72(4\beta_1+\beta_3)+k^2\xi)}{72\sqrt{2}}$	0	$(4\beta_1+\beta_3)k^2+\frac{k^4\xi}{72}$

Spin-parity form	Covariant form	Multiplicities
$0^+_{\cdot\cdot}\tau^{\perp}==0$	$\partial_\beta\partial_\alpha\tau(\Delta+\mathcal{K})^{\alpha\beta}==0$	1
$2i\,k1^-_{\cdot\cdot}\sigma^{\perp\,\alpha}+1^-_{\cdot\cdot}\tau^{\perp\,\alpha}==0$	$\partial_\chi\partial_\beta\partial^\alpha\tau(\Delta+\mathcal{K})^{\beta\chi}==\partial_\chi\partial^\chi\partial_\beta\tau(\Delta+\mathcal{K})^{\alpha\beta}+2\,\partial_\delta\partial^\delta\partial_\chi\partial_\beta\sigma^{\beta\alpha\chi}$	3
$1^-_{\cdot\cdot}\tau^{\parallel\,\alpha}==0$	$\partial_\chi\partial_\beta\partial^\alpha\tau(\Delta+\mathcal{K})^{\beta\chi}==\partial_\chi\partial^\chi\partial_\beta\tau(\Delta+\mathcal{K})^{\beta\alpha}$	3
$i\,k1^+_{\cdot\cdot}\sigma^{\perp\,\alpha\beta}+1^+_{\cdot\cdot}\tau^{\parallel\,\alpha\beta}==0$	$\partial_\chi\partial^\alpha\tau(\Delta+\mathcal{K})^{\beta\chi}+\partial_\chi\partial^\beta\tau(\Delta+\mathcal{K})^{\chi\alpha}+\partial_\chi\partial^\chi\tau(\Delta+\mathcal{K})^{\alpha\beta}+2\,\partial_\delta\partial_\chi\partial^\alpha\sigma^{\chi\,\beta\delta}+2\,\partial_\delta\partial^\delta\partial_\chi\sigma^{\chi\alpha\beta}==\partial_\chi\partial^\alpha\tau(\Delta+\mathcal{K})^{\chi\,\beta}+\partial_\chi\partial^\beta\tau(\Delta+\mathcal{K})^{\alpha\chi}+\partial_\chi\partial^\chi\tau(\Delta+\mathcal{K})^{\beta\alpha}+2\,\partial_\delta\partial_\chi\partial^\beta\sigma^{\chi\alpha\delta}$	3
Total expected gauge generators:		10

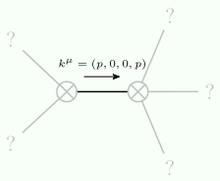
	$2^+_{\cdot\cdot}\sigma^{\parallel}{}^{\alpha\beta}$	$2^+_{\cdot\cdot}\tau^{\parallel}{}^{\alpha\beta}$	$2^+_{\cdot\cdot}\sigma^{\perp}{}^{\alpha\beta}$
$2^-_{\cdot\cdot}\sigma^{\parallel}{}^{\alpha\beta\chi}$	$0\quad 0$	$-\frac{2i\sqrt{2}}{k(\mathcal{M}_{\rm Pl}^2)}$	$\frac{32\beta_1}{8\beta_1(\mathcal{M}_{\rm Pl}^2)-(\mathcal{M}_{\rm Pl}^2)^2}$
$2^+_{\cdot\cdot}\tau^{\parallel}{}^{\alpha\beta}$		$\frac{2}{k^2(\mathcal{M}_{\rm Pl}^2)}$	$\frac{2i\sqrt{2}}{k(\mathcal{M}_{\rm Pl}^2)}$
$2^+_{\cdot\cdot}\sigma^{\perp}{}^{\alpha\beta}$	$-\frac{4}{-8\beta_1+(\mathcal{M}_{\rm Pl}^2)}$	0	0

$$\mathcal{S}==\int\int\int\int(\mathcal{A}^{\alpha\beta\chi}\,\sigma_{\alpha\beta\chi}+f^{\alpha\beta}\,\tau(\Delta+\mathcal{K})_{\alpha\beta}-\frac{1}{2}(\mathcal{M}_{\rm Pl}^2)(\mathcal{A}_{\iota,\kappa\theta}\,\mathcal{A}'^{\theta\kappa}_{\iota}+\mathcal{A}'^{\theta}_{\iota,\kappa}\,\mathcal{A}'^{\kappa}_{\theta\iota}+2\,f'^{\theta}_{\iota,\kappa}\,\mathcal{A}'^{\kappa}_{\theta\iota}+2\,f'^{\theta}_{\iota,\kappa}\,\partial_\lambda\mathcal{A}'^{\kappa}_{\theta}+\beta_3(-\mathcal{A}'^{\theta}_{\iota,\kappa}\,\mathcal{A}'^{\kappa}_{\theta\iota}+2\,\mathcal{A}'^{\kappa}_{\iota,\kappa}\,\partial_\theta f'^{\theta}_{\iota}-2\,\partial_\theta f'^{\kappa}_{\iota,\kappa}\,f'^{\theta}_{\iota})-\frac{1}{2}\theta^2\xi(\partial_\theta\mathcal{A}'^{\kappa}_{\iota,\kappa}\,\partial^\theta\mathcal{A}'^{\alpha\prime}_{\alpha}+\partial_\alpha\mathcal{A}'^{\alpha\prime\theta}_{\iota,\kappa}\,\partial_\kappa\mathcal{A}'^{\kappa}_{\theta\iota}+\partial_\alpha\mathcal{A}'^{\alpha\prime\theta}_{\iota,\kappa}\,\partial_\kappa\mathcal{A}'^{\kappa}_{\theta\iota}-2\,\partial^\theta\mathcal{A}'^{\alpha\prime}_{\alpha}\,\partial_\kappa\mathcal{A}'^{\kappa}_{\theta\iota,}+\partial_\alpha\mathcal{A}'^{\alpha\prime\theta}_{\theta\kappa}\,\partial^\kappa\mathcal{A}'^{\alpha\prime}_{\iota}-\frac{1}{3}\alpha_1(\partial_\mathcal{A}'^{\kappa}_{\theta\,\kappa}\,\partial^\theta\mathcal{A}'^{\alpha\prime}_{\alpha}+\partial_\kappa\mathcal{A}'^{\alpha\prime\theta}_{\alpha}\,\partial_\kappa\mathcal{A}'^{\kappa}_{\theta\iota}+2\,\partial^\theta\mathcal{A}'^{\alpha\prime}_{\alpha}\,\partial_\kappa\mathcal{A}'^{\kappa}_{\theta\iota,}+2\,\partial_\kappa\mathcal{A}'^{\alpha\prime\theta}_{\alpha}\,\partial_\kappa\mathcal{A}'^{\kappa}_{\theta\iota,}+2\,\partial^\theta\mathcal{A}'^{\alpha\prime}_{\alpha}\,\partial_\kappa\mathcal{A}'^{\kappa}_{\theta\iota,}+\partial_\kappa\mathcal{A}'^{\alpha\prime\theta}_{\theta\alpha}\,\partial^\kappa\mathcal{A}'^{\alpha\prime}_{\iota}+\partial_\kappa\mathcal{A}'^{\alpha\prime\theta}_{\theta\alpha}\,\partial^\kappa\mathcal{A}'^{\alpha\prime}_{\iota}+\frac{1}{6}\theta\,\xi(-\partial_\kappa\mathcal{A}'^{\lambda}_{\kappa\,\lambda}\,\partial^\theta\partial_\theta f'^{\theta}_{\iota}+\partial_\kappa\mathcal{A}'^{\lambda}_{\theta\,\lambda}\,\partial^\kappa\partial_\theta f'^{\theta}_{\iota}+\partial_\kappa\mathcal{A}'^{\lambda}_{\theta\,\lambda}\,\partial^\kappa\partial_\theta f'^{\theta}_{\iota}-\partial^\kappa\partial_\theta f'^{\theta}_{\iota,}\partial_\lambda\mathcal{A}'^{\lambda}_{\kappa\theta}+\partial^\kappa\partial_\theta f'^{\theta}_{\iota,}\partial_\lambda\mathcal{A}'^{\lambda}_{\theta\kappa}+\partial^\kappa\partial_\theta f'^{\theta}_{\iota,}\partial_\lambda\mathcal{A}'^{\lambda}_{\kappa\theta}-\partial^\kappa\partial_\theta f'^{\theta}_{\iota,}\partial_\lambda\mathcal{A}'^{\lambda}_{\kappa\theta}+\partial^\kappa\partial_\theta f'^{\theta}_{\iota,}\partial_\lambda\mathcal{A}'^{\lambda}_{\kappa\theta}+\frac{1}{72}\xi(-2\,\partial_\kappa\mathcal{A}'^{\lambda}_{\kappa\,\lambda}\,\partial^\kappa\partial_\theta f'^{\theta}_{\iota,}+2\,\partial_\kappa\mathcal{A}'^{\lambda}_{\iota,\lambda}\,\partial^\kappa\partial_\theta f'^{\theta}_{\iota,}-\partial^\kappa\partial_\theta f'^{\theta}_{\iota,}\partial_\lambda\mathcal{A}'^{\lambda}_{\kappa\theta}+\partial^\kappa\partial_\theta f'^{\theta}_{\iota,}\partial_\lambda\mathcal{A}'^{\lambda}_{\theta\kappa}+2\,\partial_\kappa\mathcal{A}'^{\lambda}_{\iota,\lambda}\,\partial^\kappa\partial_\theta f'^{\theta}_{\iota,}-\partial^\kappa\partial_\theta f'^{\theta}_{\iota,}\partial_\lambda\mathcal{A}'^{\lambda}_{\kappa\theta}+\partial^\kappa\partial_\theta f'^{\theta}_{\iota,}\partial_\lambda\mathcal{A}'^{\lambda}_{\kappa\theta}+\partial_\kappa\mathcal{A}'^{\lambda}_{\theta\,\lambda}(\partial^\kappa\mathcal{A}'^{\theta}_{\iota,}+\partial^\kappa\partial_\theta f'^{\theta}_{\iota,})+\partial^\kappa\partial_\theta f'^{\theta}_{\iota,}\partial_\lambda\partial_\theta f'^{\lambda}_{\kappa}+\partial^\kappa\partial_\theta f'^{\theta}_{\iota,}\partial_\lambda\partial_\theta f'^{\lambda}_{\kappa})](t,x,y,z]\,d\,z\,d\,y\,d\,x\,d\,t$$

Massive and massless spectra



Massive particle



Massless particle

Pole residue: $-\frac{1}{(48(65536\beta_1^4(1+6\theta)^2-13824\beta_3^3\theta^2((\mathcal{M}_{\rm Pl}^2)+\theta^2\xi)+48\beta_3(\mathcal{M}_{\rm Pl}^2)^2(2(-1+8\theta)(\mathcal{M}_{\rm Pl}^2)+3\theta^2(1+8\theta-16\theta^2)\xi)+512\beta_1^3(96\beta_3(1+16\theta+60\theta^2)+16(-1+36\theta^2)(\mathcal{M}_{\rm Pl}^2)-(1+8\theta+24\theta^2)^2\xi)-288\beta_3^2\theta(\mathcal{M}_{\rm Pl}^2)(8(-1+2\theta)(\mathcal{M}_{\rm Pl}^2)+\theta(-1-8\theta+32\theta^2)\xi)+(\mathcal{M}_{\rm Pl}^2)^3(-32(\mathcal{M}_{\rm Pl}^2)+(1+16\theta+112\theta^2+384\theta^3)\xi)+192\beta_1^2(768\beta_3^2\theta(1+7\theta)-48\beta_3(2(1+8\theta+4\theta^2)(\mathcal{M}_{\rm Pl}^2)+\theta^2(1+8\theta+24\theta^2)\xi)+(\mathcal{M}_{\rm Pl}^2)(-16(1+12\theta+24\theta^2)(\mathcal{M}_{\rm Pl}^2)+(1+16\theta+88\theta^2+192\theta^3)\xi))+8\beta_1(13824\beta_3^3\theta^2-288\beta_3(\mathcal{M}_{\rm Pl}^2)((-1+16\theta^2)(\mathcal{M}_{\rm Pl}^2)+16\theta^4\xi)-288\beta_3^2\theta(8(2+5\theta)(\mathcal{M}_{\rm Pl}^2)+\theta(1+8\theta+40\theta^2)\xi)+(\mathcal{M}_{\rm Pl}^2)^2(16(5+24\theta)(\mathcal{M}_{\rm Pl}^2)-3(1+16\theta+88\theta^2+192\theta^3+384\theta^4)\xi))))/((48\beta_3\theta^2+8\beta_1(1+8\theta+24\theta^2)-(1+8\theta)(\mathcal{M}_{\rm Pl}^2))^2\xi(1536\beta_1^2+(\mathcal{M}_{\rm Pl}^2)(-48(\mathcal{M}_{\rm Pl}^2)+\xi+8\theta\xi)-48\beta_3(3(\mathcal{M}_{\rm Pl}^2)+\theta^2\xi)+8\beta_1(144\beta_3+24(\mathcal{M}_{\rm Pl}^2)-(1+8\theta+24\theta^2)\xi))))>0$

Poleresidue:	$\frac{1}{(\mathcal{M}_{\rm Pl}^2)}>0$
Polarisations:	2

Square mass:	$-\frac{24(8\beta_1-(\mathcal{M}_{\rm Pl}^2))(4\beta_1+3\beta_3+(\mathcal{M}_{\rm Pl}^2))}{(48\beta_3\theta^2+8\beta_1(1+8\theta+24\theta^2)-(1+8\theta)(\mathcal{M}_{\rm Pl}^2))\xi}>0$
Spin:	1
Parity:	Odd

Unitarity conditions

$$(\mathcal{M}_{\rm Pl}^2)>0\;\&\&\;\xi<0\;\&\&\;(\beta_1<\frac{(\mathcal{M}_{\rm Pl}^2)}{8}\;\&\&\;((\frac{1}{3}(-4\beta_1-(\mathcal{M}_{\rm Pl}^2))<\beta_3<-4\beta_1\;\&\&\;(\theta<\frac{-8\beta_1+(\mathcal{M}_{\rm Pl}^2)}{12(4\beta_1+\beta_3)}-\frac{1}{12}\sqrt{\frac{-32\beta_1^2-24\beta_1\beta_3-4\beta_1(\mathcal{M}_{\rm Pl}^2)+3\beta_3(\mathcal{M}_{\rm Pl}^2)+(\mathcal{M}_{\rm Pl}^2)^2}{(4\beta_1+\beta_3)^2}}\;||\;\theta>\frac{-8\beta_1+(\mathcal{M}_{\rm Pl}^2)}{12(4\beta_1+\beta_3)}+\frac{1}{12}\sqrt{\frac{-32\beta_1^2-24\beta_1\beta_3-4\beta_1(\mathcal{M}_{\rm Pl}^2)+3\beta_3(\mathcal{M}_{\rm Pl}^2)+(\mathcal{M}_{\rm Pl}^2)^2}{(4\beta_1+\beta_3)^2}}))\;||$$

$$(\beta_3==-4\beta_1\;\&\&\;\theta>-\frac{1}{8})\;||\;(\beta_3>-4\beta_1\;\&\&\;\frac{-8\beta_1+(\mathcal{M}_{\rm Pl}^2)}{12(4\beta_1+\beta_3)}-\frac{1}{12}\sqrt{\frac{-32\beta_1^2-24\beta_1\beta_3-4\beta_1(\mathcal{M}_{\rm Pl}^2)+3\beta_3(\mathcal{M}_{\rm Pl}^2)+(\mathcal{M}_{\rm Pl}^2)^2}{(4\beta_1+\beta_3)^2}}<\theta<\frac{-8\beta_1+(\mathcal{M}_{\rm Pl}^2)}{12(4\beta_1+\beta_3)}+\frac{1}{12}\sqrt{\frac{-32\beta_1^2-24\beta_1\beta_3-4\beta_1(\mathcal{M}_{\rm Pl}^2)+3\beta_3(\mathcal{M}_{\rm Pl}^2)+(\mathcal{M}_{\rm Pl}^2)^2}{(4\beta_1+\beta_3)^2}}))\;||$$

$$(\beta_1>\frac{(\mathcal{M}_{\rm Pl}^2)}{8}\;\&\&\;((\beta_3<-4\beta_1\;\&\&\;(\theta<\frac{-8\beta_1+(\mathcal{M}_{\rm Pl}^2)}{12(4\beta_1+\beta_3)}-\frac{1}{12}\sqrt{\frac{-32\beta_1^2-24\beta_1\beta_3-4\beta_1(\mathcal{M}_{\rm Pl}^2)+3\beta_3(\mathcal{M}_{\rm Pl}^2)+(\mathcal{M}_{\rm Pl}^2)^2}{(4\beta_1+\beta_3)^2}}\;||\;\theta>\frac{-8\beta_1+(\mathcal{M}_{\rm Pl}^2)}{12(4\beta_1+\beta_3)}+\frac{1}{12}\sqrt{\frac{-32\beta_1^2-24\beta_1\beta_3-4\beta_1(\mathcal{M}_{\rm Pl}^2)+3\beta_3(\mathcal{M}_{\rm Pl}^2)+(\mathcal{M}_{\rm Pl}^2)^2}{(4\beta_1+\beta_3)^2}}))\;||\;(\beta_3==-4\beta_1\;\&\&\;\theta<-\frac{1}{8})\;||$$

$$(-4\beta_1<\beta_3<\frac{1}{3}(-4\beta_1-(\mathcal{M}_{\rm Pl}^2))\;\&\&\;\frac{-8\beta_1+(\mathcal{M}_{\rm Pl}^2)}{12(4\beta_1+\beta_3)}-\frac{1}{12}\sqrt{\frac{-32\beta_1^2-24\beta_1\beta_3-4\beta_1(\mathcal{M}_{\rm Pl}^2)+3\beta_3(\mathcal{M}_{\rm Pl}^2)+(\mathcal{M}_{\rm Pl}^2)^2}{(4\beta_1+\beta_3)^2}}<\theta<\frac{-8\beta_1+(\mathcal{M}_{\rm Pl}^2)}{12(4\beta_1+\beta_3)}+\frac{1}{12}\sqrt{\frac{-32\beta_1^2-24\beta_1\beta_3-4\beta_1(\mathcal{M}_{\rm Pl}^2)+3\beta_3(\mathcal{M}_{\rm Pl}^2)+(\mathcal{M}_{\rm Pl}^2)^2}{(4\beta_1+\beta_3)^2}})\;||\;\beta_3>\frac{1}{3}(-4\beta_1-(\mathcal{M}_{\rm Pl}^2))))$$