PSALTer results panel

Wave operator

Saturated propagator

Source constraints

Spin-parity form	Covariant form	Multiplicities
$0^+_-\tau^\dagger == 0$	$\partial_\beta\partial_\alpha\tau(\Delta+\mathcal{K})^{\alpha\beta} == 0$	1
$-2ik\,0^+_-\sigma^\dagger + 0^+_-\tau^\dagger == 0$	$\partial_\beta\partial_\alpha\tau(\Delta+\mathcal{K})^{\alpha\beta} == \partial_\beta\partial^\beta\tau(\Delta+\mathcal{K})_\alpha{}^\alpha + 2\partial_\chi\partial^\chi\partial_\beta\sigma_\alpha{}^\beta$	1
$2ik\,1^-_-\sigma^\alpha + 1^-_-\tau^\alpha == 0$	$\partial_\chi\partial_\beta\partial^\alpha\tau(\Delta+\mathcal{K})^{\beta\chi} == \partial_\chi\partial^\chi\partial_\beta\tau(\Delta+\mathcal{K})^{\alpha\beta} + 2\partial_\beta\partial^\beta\partial_\chi\sigma^{\beta\alpha\chi}$	3
$1^-_-\tau^\alpha == 0$	$\partial_\chi\partial_\beta\partial^\alpha\tau(\Delta+\mathcal{K})^{\beta\chi} == \partial_\chi\partial^\chi\partial_\beta\tau(\Delta+\mathcal{K})^{\beta\alpha}$	3
$ik\,1^+_-\sigma^{\alpha\beta} + 1^+_-\tau^{\dagger\,\alpha\beta} == 0$	$\partial_\chi\partial^\chi\tau(\Delta+\mathcal{K})^{\beta\chi} + \partial_\chi\partial^\beta\tau(\Delta+\mathcal{K})^{\chi\alpha} + \partial_\chi\partial^\chi\tau(\Delta+\mathcal{K})^{\alpha\beta} + 2\partial_\chi\partial_\delta\partial^\alpha\sigma^{\chi\beta\delta} + 2\partial_\delta\partial^\delta\partial_\chi\sigma^{\chi\alpha\delta} == \partial_\chi\partial^\alpha\tau(\Delta+\mathcal{K})^{\chi\beta} + \partial_\chi\partial^\beta\tau(\Delta+\mathcal{K})^{\alpha\chi} + \partial_\chi\partial^\chi\tau(\Delta+\mathcal{K})^{\beta\alpha} + 2\partial_\delta\partial_\chi\partial^\beta\sigma^{\chi\alpha\delta}$	3
$2^-_-\sigma^{\dagger\,\alpha\beta\chi} == 0$	$3\,\partial_\alpha\partial_\delta\partial^\chi\partial^\alpha\sigma^{\delta\beta\epsilon} + 3\,\partial_\alpha\partial^\epsilon\partial^\chi\partial^\alpha\sigma^{\beta\beta}{}_\delta + 2\,\partial_\alpha\partial^\epsilon\partial_\delta\partial^\beta\sigma^{\alpha\chi\delta} + 4\,\partial_\alpha\partial^\epsilon\partial_\delta\partial^\alpha\sigma^{\chi\alpha\delta} + 2\,\partial_\alpha\partial^\epsilon\partial_\delta\partial^\alpha\sigma^{\delta\alpha\chi} + 2\,\partial_\alpha\partial_\delta\partial^\chi\partial^\epsilon\sigma^{\beta\alpha\delta} + 4\,\partial_\alpha\partial^\epsilon\partial_\delta\partial^\alpha\sigma^{\delta\alpha\beta} + 2\,\partial_\alpha\partial^\epsilon\partial_\delta\partial^\alpha\sigma^{\alpha\beta\chi} + 3\,\eta^{\beta\chi}\,\partial_\alpha\partial^\alpha\partial_\delta\partial^\alpha\sigma^\delta{}_\delta{}^\epsilon + 3\,\eta^{\alpha\chi}\,\partial_\alpha\partial^\alpha\partial_\delta\partial_\delta\sigma^{\delta\beta\epsilon} + 3\,\eta^{\beta\chi}\,\partial_\alpha\partial^\beta\partial_\delta\partial_\epsilon\sigma^{\delta\alpha}{}_\delta ==$ $3\,\partial_\alpha\partial_\delta\partial^\alpha\partial^\alpha\sigma^{\delta\alpha\epsilon} + 3\,\partial_\alpha\partial^\epsilon\partial^\chi\partial^\alpha\sigma_\alpha{}^\beta{}_\delta + 2\,\partial_\alpha\partial^\epsilon\partial_\delta\partial^\alpha\sigma^{\beta\chi\delta} + 4\,\partial_\alpha\partial^\epsilon\partial_\delta\partial^\alpha\sigma^{\chi\beta\delta} + 2\,\partial_\alpha\partial^\epsilon\partial_\delta\partial^\alpha\sigma^{\alpha\beta\chi} + 2\,\partial_\alpha\partial^\epsilon\partial_\delta\partial^\alpha\sigma^{\beta\alpha\chi} + 4\,\partial_\alpha\partial_\delta\partial^\epsilon\sigma^{\chi\alpha\beta} + 3\,\eta^{\alpha\chi}\,\partial_\alpha\partial^\beta\partial_\delta\partial^\alpha\sigma^\delta{}_\delta{}^\epsilon + 3\,\eta^{\beta\chi}\,\partial_\alpha\partial^\beta\partial_\delta\sigma^{\delta\alpha\epsilon} + 3\,\eta^{\alpha\chi}\,\partial_\alpha\partial^\beta\partial_\delta\sigma^{\delta\beta}{}_\delta$	5
$2^+_-\tau^{\dagger\,\alpha\beta} == 0$	$4\,\partial_\delta\partial_\chi\partial^\beta\partial^\alpha\tau(\Delta+\mathcal{K})^{\chi\delta} + 2\,\partial_\delta\partial^\beta\partial^\beta\partial^\chi\tau(\Delta+\mathcal{K})^\chi{}_\chi + 3\,\partial_\delta\partial^\delta\partial_\chi\partial^\chi\tau(\Delta+\mathcal{K})^{\alpha\beta} + 3\,\partial_\delta\partial^\delta\partial_\chi\partial^\chi\tau(\Delta+\mathcal{K})^{\beta\alpha} + 2\,\eta^{\alpha\beta}\,\partial_\delta\partial^\delta\partial_\chi\partial_\chi\tau(\Delta+\mathcal{K})^{\chi\delta} == 3\,\partial_\delta\partial^\delta\partial_\chi\partial^\chi\tau(\Delta+\mathcal{K})^{\beta\chi} + 3\,\partial_\delta\partial^\delta\partial_\chi\partial^\chi\tau(\Delta+\mathcal{K})^{\chi\beta} + 3\,\partial_\delta\partial^\delta\partial_\chi\tau(\Delta+\mathcal{K})^{\chi\alpha} + 3\,\partial_\delta\partial^\delta\partial_\chi\tau(\Delta+\mathcal{K})^{\chi\alpha} + 2\,\eta^{\alpha\beta}\,\partial_\delta\partial^\delta\partial_\chi\tau(\Delta+\mathcal{K})^\chi{}_\chi$	5
Total expected gauge generators:		21
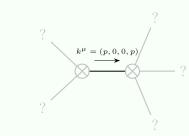
Massive spectrum

Massive particle

Pole residue:	$-\dfrac{1}{r_2} > 0$
Square mass:	$-\dfrac{t_2}{r_2} > 0$
Spin:	0
Parity:	Odd

Massless spectrum

Massless particle

Pole residue:	$-\dfrac{14}{r_3} + \dfrac{57}{2r_3+r_5} - \dfrac{216}{r_3+2r_5} > 0$
Polarisations:	2

Unitarity conditions

$$r_2 < 0 \;\&\&\; t_2 > 0 \;\&\&\; \left(\left(r_3 < 0 \;\&\&\; \left(r_5 < -\tfrac{r_3}{2} \;\|\; r_5 > -2\,r_3\right)\right) \;\|\; \left(r_3 > 0 \;\&\&\; -2\,r_3 < r_5 < -\tfrac{r_3}{2}\right)\right)$$