Basis SMEFTsim-U35 (EFT SMEFT)

Basis used in the SMEFTsim_U35 UFO models, version 3.0.0 or later. Implements Warsaw basis with $U(3)$ flavor symmetry for all fermions. For each operator, only the lowest-order flavor structure is kept. q, u, d are the left- and right-handed quark fields. ℓ, e are left- and right-handed lepton fields. Y_l, Y_u, Y_d are the 3x3 yukawa matrices for leptons, up- and down-quarks, defined by $L_{SM} \supset \bar{d} Y_d H^\dagger q$ and analogously for the others. Quark fields are in the up-aligned basis: Y_l, Y_u are assumed diagonal at the scale of evaluation, while $Y_d = Y_d^{diag} V_{CKM}^\dagger$. Flavor indices are indicated with p, r, s, t with Einstein conventions on repeated indices. They run over 1,2,3 for all fields. This basis definition corresponds to a fixed LambdaSMEFT=10e+3 in the UFO models. Notation and conventions can vary compared to the Warsaw basis paper, see arXiv:2012.11343 for all definitions.

Sectors

The effective Lagrangian is defined as

$$\mathcal{L}_{\text{eff}} = -\mathcal{H}_{\text{eff}} = \sum_{O_i = O_i^\dagger} C_i O_i + \sum_{O_i \neq O_i^\dagger} \left(C_i O_i + C_i^* O_i^\dagger \right).$$

dB=dL=0

WC name	Operator	Type
cG	$f^{ABC} G_\mu^{A\nu} G_\nu^{B\rho} G_\rho^{C\mu} / TeV^2$	R
cGtil	$f^{ABC} \widetilde{G}_\mu^{A\nu} G_\nu^{B\rho} G_\rho^{C\mu} / TeV^2$	R
cW	$\varepsilon^{IJK} W_\mu^{I\nu} W_\nu^{J\rho} W_\rho^{K\mu} / TeV^2$	R
cWtil	$\varepsilon^{IJK} \widetilde{W}_\mu^{I\nu} W_\nu^{J\rho} W_\rho^{K\mu} / TeV^2$	R
cH	$(H^\dagger H)^3 / TeV^2$	R
cHbox	$(H^\dagger H) \Box (H^\dagger H) / TeV^2$	R
cHDD	$(D_\mu H^\dagger H)(H^\dagger D^\mu H) / TeV^2$	R
cHG	$G_{\mu\nu}^A G^{A\mu\nu} H^\dagger H / TeV^2$	R
cHGtil	$\widetilde{G}_{\mu\nu}^A G^{A\mu\nu} H^\dagger H / TeV^2$	R
cHW	$W_{\mu\nu}^I W^{I\mu\nu} H^\dagger H / TeV^2$	R
cHWtil	$\widetilde{W}_{\mu\nu}^I W^{I\mu\nu} H^\dagger H / TeV^2$	R
cHB	$B_{\mu\nu} B^{\mu\nu} H^\dagger H / TeV^2$	R
cHBtil	$\widetilde{B}_{\mu\nu} B^{\mu\nu} H^\dagger H / TeV^2$	R
cHWB	$B_{\mu\nu} W^{I\mu\nu} H^\dagger \sigma^I H / TeV^2$	R
cHWBtil	$B_{\mu\nu} \widetilde{W}^{I\mu\nu} H^\dagger \sigma^I H / TeV^2$	R
ceHRe	$(Y_l^\dagger)_{pr} (\bar{\ell}_p H e_r)(H^\dagger H) / TeV^2 + hc$	R
ceHIm	$i (Y_l^\dagger)_{pr} (\bar{\ell}_p H e_r)(H^\dagger H) / TeV^2 + hc$	R
cuHRe	$(Y_u^\dagger)_{pr} (\bar{q}_p \tilde{H} u_r)(H^\dagger H) / TeV^2 + hc$	R
cuHIm	$i (Y_u^\dagger)_{pr} (\bar{q}_p \tilde{H} u_r)(H^\dagger H) / TeV^2 + hc$	R
cdHRe	$(Y_d^\dagger)_{pr} (\bar{q}_p H d_r)(H^\dagger H) / TeV^2 + hc$	R

WC name	Operator	Type
cdHIm	$i(Y_d^\dagger)_{pr}(\bar{q}_p H d_r)(H^\dagger H)/TeV^2 + hc$	R
ceWRe	$(Y_l^\dagger)_{pr}(\bar{\ell}_p \sigma^I H \sigma^{\mu\nu} e_r) W^I_{\mu\nu}/TeV^2 + hc$	R
ceWIm	$i(Y_l^\dagger)_{pr}(\bar{\ell}_p \sigma^I H \sigma^{\mu\nu} e_r) W^I_{\mu\nu}/TeV^2 + hc$	R
ceBRe	$(Y_l^\dagger)_{pr}(\bar{\ell}_p H \sigma^{\mu\nu} e_r) B_{\mu\nu}/TeV^2 + hc$	R
ceBIm	$i(Y_l^\dagger)_{pr}(\bar{\ell}_p H \sigma^{\mu\nu} e_r) B_{\mu\nu}/TeV^2 + hc$	R
cuGRe	$(Y_u^\dagger)_{pr}(\bar{q}_p \tilde{H} \sigma^{\mu\nu} T^A u_r) G^A_{\mu\nu}/TeV^2 + hc$	R
cuGIm	$i(Y_u^\dagger)_{pr}(\bar{q}_p \tilde{H} \sigma^{\mu\nu} T^A u_r) G^A_{\mu\nu}/TeV^2 + hc$	R
cuWRe	$(Y_u^\dagger)_{pr}(\bar{q}_p \sigma^I \tilde{H} \sigma^{\mu\nu} u_r) W^I_{\mu\nu}/TeV^2 + hc$	R
cuWIm	$i(Y_u^\dagger)_{pr}(\bar{q}_p \sigma^I \tilde{H} \sigma^{\mu\nu} u_r) W^I_{\mu\nu}/TeV^2 + hc$	R
cuBRe	$(Y_u^\dagger)_{pr}(\bar{q}_p \tilde{H} \sigma^{\mu\nu} u_r) B_{\mu\nu}/TeV^2 + hc$	R
cuBIm	$i(Y_u^\dagger)_{pr}(\bar{q}_p \tilde{H} \sigma^{\mu\nu} u_r) B_{\mu\nu}/TeV^2 + hc$	R
cdGRe	$(Y_d^\dagger)_{pr}(\bar{q}_p H \sigma^{\mu\nu} T^A d_r) G^A_{\mu\nu}/TeV^2 + hc$	R
cdGIm	$i(Y_d^\dagger)_{pr}(\bar{q}_p H \sigma^{\mu\nu} T^A d_r) G^A_{\mu\nu}/TeV^2 + hc$	R
cdWRe	$(Y_d^\dagger)_{pr}(\bar{q}_p \sigma^I H \sigma^{\mu\nu} d_r) W^I_{\mu\nu}/TeV^2 + hc$	R
cdWIm	$i(Y_d^\dagger)_{pr}(\bar{q}_p \sigma^I H \sigma^{\mu\nu} d_r) W^I_{\mu\nu}/TeV^2 + hc$	R
cdBRe	$(Y_d^\dagger)_{pr}(\bar{q}_p H \sigma^{\mu\nu} d_r) B_{\mu\nu}/TeV^2 + hc$	R
cdBIm	$i(Y_d^\dagger)_{pr}(\bar{q}_p H \sigma^{\mu\nu} d_r) B_{\mu\nu}/TeV^2 + hc$	R
cHl1	$(H^\dagger i \overleftrightarrow{D}_\mu H)(\bar{\ell}_p \gamma^\mu \ell_p)/TeV^2$	R
cHl3	$(H^\dagger i \overleftrightarrow{D}^I_\mu H)(\bar{\ell}_p \gamma^\mu \sigma^I \ell_p)/TeV^2$	R
cHq1	$(H^\dagger i \overleftrightarrow{D}_\mu H)(\bar{q}_p \gamma^\mu q_p)/TeV^2$	R
cHq3	$(H^\dagger i \overleftrightarrow{D}^I_\mu H)(\bar{q}_p \gamma^\mu \sigma^I q_p)/TeV^2$	R
cHe	$(H^\dagger i \overleftrightarrow{D}_\mu H)(\bar{e}_p \gamma^\mu e_p)/TeV^2$	R
cHu	$(H^\dagger i \overleftrightarrow{D}_\mu H)(\bar{u}_p \gamma^\mu u_p)/TeV^2$	R
cHd	$(H^\dagger i \overleftrightarrow{D}_\mu H)(\bar{d}_p \gamma^\mu d_p)/TeV^2$	R
cHudRe	$(Y_u Y_d^\dagger)_{pr}(\tilde{H}^\dagger i D_\mu H)(\bar{u}_p \gamma^\mu d_r)/TeV^2 + hc$	R
cHudIm	$i(Y_u Y_d^\dagger)_{pr}(\tilde{H}^\dagger i D_\mu H)(\bar{u}_p \gamma^\mu d_r)/TeV^2 + hc$	R
cll	$(\bar{\ell}_p \gamma_\mu \ell_p)(\bar{\ell}_r \gamma^\mu \ell_r)/TeV^2$	R
cll1	$(\bar{\ell}_p \gamma_\mu \ell_r)(\bar{\ell}_r \gamma^\mu \ell_p)/TeV^2$	R
clq1	$(\bar{\ell}_p \gamma_\mu \ell_p)(\bar{q}_r \gamma^\mu q_r)/TeV^2$	R
clq3	$(\bar{\ell}_p \gamma_\mu \sigma^I \ell_p)(\bar{q}_r \gamma^\mu \sigma^I q_r)/TeV^2$	R
cqq1	$(\bar{q}_p \gamma_\mu q_p)(\bar{q}_r \gamma^\mu q_r)/TeV^2$	R
cqq11	$(\bar{q}_p \gamma_\mu q_r)(\bar{q}_r \gamma^\mu q_p)/TeV^2$	R
cqq3	$(\bar{q}_p \gamma_\mu \sigma^I q_p)(\bar{q}_r \gamma^\mu \sigma^I q_r)/TeV^2$	R
cqq31	$(\bar{q}_p \gamma_\mu \sigma^I q_r)(\bar{q}_r \gamma^\mu \sigma^I q_p)/TeV^2$	R
cee	$(\bar{e}_p \gamma_\mu e_p)(\bar{e}_r \gamma^\mu e_r)/TeV^2$	R
cuu	$(\bar{u}_p \gamma_\mu u_p)(\bar{u}_r \gamma^\mu u_r)/TeV^2$	R
cuu1	$(\bar{u}_p \gamma_\mu u_r)(\bar{u}_r \gamma^\mu u_p)/TeV^2$	R
cdd	$(\bar{d}_p \gamma_\mu d_p)(\bar{d}_r \gamma^\mu d_r)/TeV^2$	R
cdd1	$(\bar{d}_p \gamma_\mu d_r)(\bar{d}_r \gamma^\mu d_p)/TeV^2$	R
ceu	$(\bar{e}_p \gamma_\mu e_p)(\bar{u}_r \gamma^\mu u_r)/TeV^2$	R
ced	$(\bar{e}_p \gamma_\mu e_p)(\bar{d}_r \gamma^\mu d_r)/TeV^2$	R

WC name	Operator	Type
cud1	$(\bar{u}_p\gamma_\mu u_p)(\bar{d}_r\gamma^\mu d_r)/TeV^2$	R
cud8	$(\bar{u}_p\gamma_\mu T^A u_p)(\bar{d}_r\gamma^\mu T^A d_r)/TeV^2$	R
cle	$(\bar{\ell}_p\gamma_\mu \ell_p)(\bar{e}_r\gamma^\mu e_r)/TeV^2$	R
clu	$(\bar{\ell}_p\gamma_\mu \ell_p)(\bar{u}_r\gamma^\mu u_r)/TeV^2$	R
cld	$(\bar{\ell}_p\gamma_\mu \ell_p)(\bar{d}_r\gamma^\mu d_r)/TeV^2$	R
cqe	$(\bar{q}_p\gamma_\mu q_p)(\bar{e}_r\gamma^\mu e_r)/TeV^2$	R
cqu1	$(\bar{q}_p\gamma_\mu q_p)(\bar{u}_r\gamma^\mu u_r)/TeV^2$	R
cqu8	$(\bar{q}_p\gamma_\mu T^A q_p)(\bar{u}_r\gamma^\mu T^A u_r)/TeV^2$	R
cqd1	$(\bar{q}_p\gamma_\mu q_p)(\bar{d}_r\gamma^\mu d_r)/TeV^2$	R
cqd8	$(\bar{q}_p\gamma_\mu T^A q_p)(\bar{d}_r\gamma^\mu T^A d_r)/TeV^2$	R
cledqRe	$(Y_l^\dagger)_{pr}Y_{d,st}(\bar{\ell}_p^I e_r)(\bar{d}_s q_t^I)/TeV^2 + hc$	R
cledqIm	$i(Y_l^\dagger)_{pr}Y_{d,st}(\bar{\ell}_p^I e_r)(\bar{d}_s q_t^I)/TeV^2 + hc$	R
cquqd1Re	$(Y_u^\dagger)_{pr}(Y_d^\dagger)_{st}(\bar{q}_p^I u_r)(\bar{q}_s^J d_t)\varepsilon_{IJ}/TeV^2 + hc$	R
cquqd1Im	$i(Y_u^\dagger)_{pr}(Y_d^\dagger)_{st}(\bar{q}_p^I u_r)(\bar{q}_s^J d_t)\varepsilon_{IJ}/TeV^2 + hc$	R
cquqd11Re	$(Y_u^\dagger)_{sr}(Y_d^\dagger)_{pt}(\bar{q}_p^I u_r)(\bar{q}_s^J d_t)\varepsilon_{IJ}/TeV^2 + hc$	R
cquqd11Im	$i(Y_u^\dagger)_{sr}(Y_d^\dagger)_{pt}(\bar{q}_p^I u_r)(\bar{q}_s^J d_t)\varepsilon_{IJ}/TeV^2 + hc$	R
cquqd8Re	$(Y_u^\dagger)_{pr}(Y_d^\dagger)_{st}(\bar{q}_p^I T^A u_r)(\bar{q}_s^J T^A d_t)\varepsilon_{IJ}/TeV^2 + hc$	R
cquqd8Im	$i(Y_u^\dagger)_{pr}(Y_d^\dagger)_{st}(\bar{q}_p^I T^A u_r)(\bar{q}_s^J T^A d_t)\varepsilon_{IJ}/TeV^2 + hc$	R
cquqd81Re	$(Y_u^\dagger)_{sr}(Y_d^\dagger)_{pt}(\bar{q}_p^I T^A u_r)(\bar{q}_s^J T^A d_t)\varepsilon_{IJ}/TeV^2 + hc$	R
cquqd81Im	$i(Y_u^\dagger)_{sr}(Y_d^\dagger)_{pt}(\bar{q}_p^I T^A u_r)(\bar{q}_s^J T^A d_t)\varepsilon_{IJ}/TeV^2 + hc$	R
clequ1Re	$(Y_l^\dagger)_{pr}(Y_u^\dagger)_{st}(\bar{\ell}_p^I e_r)(\bar{q}_s^J u_t)\varepsilon_{IJ}/TeV^2 + hc$	R
clequ1Im	$i(Y_l^\dagger)_{pr}(Y_u^\dagger)_{st}(\bar{\ell}_p^I e_r)(\bar{q}_s^J u_t)\varepsilon_{IJ}/TeV^2 + hc$	R
clequ3Re	$(Y_l^\dagger)_{pr}(Y_u^\dagger)_{st}(\bar{\ell}_p^I \sigma_{\mu\nu} e_r)(\bar{q}_s^J \sigma^{\mu\nu} u_t)\varepsilon_{IJ}/TeV^2 + hc$	R
clequ3Im	$i(Y_l^\dagger)_{pr}(Y_u^\dagger)_{st}(\bar{\ell}_p^I \sigma_{\mu\nu} e_r)(\bar{q}_s^J \sigma^{\mu\nu} u_t)\varepsilon_{IJ}/TeV^2 + hc$	R