# Basis flavio (EFT WET-3)

# Sectors

The effective Lagrangian is defined as

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

#### sdsd

WC name	Operator	Type
CVLL_sdsd	$(\bar{d}_L \gamma^\mu s_L)(\bar{d}_L \gamma_\mu s_L)$	С
CVRR_sdsd	$(\bar{d}_R \gamma^\mu s_R)(\bar{d}_R \gamma_\mu s_R)$	$\mathbf{C}$
CSLL_sdsd	$(ar{d}_R s_L)(ar{d}_R s_L)$	$\mathbf{C}$
CSRR_sdsd	$(ar{d}_L s_R)(ar{d}_L s_R)$	$\mathbf{C}$
CTLL_sdsd	$(\bar{d}_R \sigma^{\mu\nu} s_L)(\bar{d}_R \sigma_{\mu\nu} s_L)$	$\mathbf{C}$
CTRR_sdsd	$(\bar{d}_L \sigma^{\mu\nu} s_R)(\bar{d}_L \sigma_{\mu\nu} s_R)$	$\mathbf{C}$
CVLR_sdsd	$(\bar{d}_L \gamma^\mu s_L)(\bar{d}_R \gamma_\mu s_R)$	$\mathbf{C}$
CSLR_sdsd	$(ar{d}_R s_L)(ar{d}_L s_R)$	$\mathbf{C}$

#### sdnunu

WC name	Operator	Type
CL_sdnuenue	$\frac{4G_F}{\sqrt{2}}V_{td}V_{ts}^*\frac{e^2}{16\pi^2}(\bar{s}_L\gamma^{\mu}d_L)(\bar{\nu}_e\gamma_{\mu}(1-\gamma_5)\nu_e)$	C
CL_sdnumunumu	$\frac{4G_F}{\sqrt{2}}V_{td}V_{ts}^* \frac{e^2}{16\pi^2}(\bar{s}_L\gamma^\mu d_L)(\bar{\nu}_\mu\gamma_\mu(1-\gamma_5)\nu_\mu)$	$\mathbf{C}$
CL_sdnutaunutau	$\frac{4G_F}{\sqrt{2}}V_{td}V_{ts}^*\frac{e^2}{16\pi^2}(\bar{s}_L\gamma^{\mu}d_L)(\bar{\nu}_{\tau}\gamma_{\mu}(1-\gamma_5)\nu_{\tau})$	$\mathbf{C}$
CL_sdnuenumu	$\frac{4G_F}{\sqrt{2}}V_{td}V_{ts}^*\frac{e^2}{16\pi^2}(\bar{s}_L\gamma^{\mu}d_L)(\bar{\nu}_{\mu}\gamma_{\mu}(1-\gamma_5)\nu_e)$	$\mathbf{C}$
CL_sdnumunue	$\frac{4G_F}{\sqrt{2}}V_{td}V_{ts}^* \frac{e^2}{16\pi^2}(\bar{s}_L\gamma^\mu d_L)(\bar{\nu}_e\gamma_\mu(1-\gamma_5)\nu_\mu)$	$\mathbf{C}$
CL_sdnumunutau	$\frac{4G_F}{\sqrt{2}}V_{td}V_{ts}^*\frac{e^2}{16\pi^2}(\bar{s}_L\gamma^{\mu}d_L)(\bar{\nu}_{\tau}\gamma_{\mu}(1-\gamma_5)\nu_{\mu})$	$\mathbf{C}$
CL_sdnutaunumu	$rac{4G_F}{\sqrt{2}}V_{td}V_{ts}^*rac{e^2}{16\pi^2}(\bar{s}_L\gamma^{\mu}d_L)(\bar{ u}_{\mu}\gamma_{\mu}(1-\gamma_5) u_{ au})$	$\mathbf{C}$
CL_sdnuenutau	$\frac{4G_F}{\sqrt{2}}V_{td}V_{ts}^* \frac{e^2}{16\pi^2}(\bar{s}_L\gamma^\mu d_L)(\bar{\nu}_\tau\gamma_\mu(1-\gamma_5)\nu_e)$	$\mathbf{C}$
CL_sdnutaunue	$\frac{4G_F}{\sqrt{2}}V_{td}V_{ts}^* \frac{e^2}{16\pi^2}(\bar{s}_L\gamma^{\mu}d_L)(\bar{\nu}_e\gamma_{\mu}(1-\gamma_5)\nu_{ au})$	$\mathbf{C}$
CR_sdnuenue	$\frac{4G_F}{\sqrt{2}}V_{td}V_{ts}^*\frac{e^2}{16\pi^2}(\bar{s}_R\gamma^{\mu}d_R)(\bar{\nu}_e\gamma_{\mu}(1-\gamma_5)\nu_e)$	$\mathbf{C}$
CR_sdnumunumu	$\frac{4G_F}{\sqrt{2}}V_{td}V_{ts}^*\frac{e^2}{16\pi^2}(\bar{s}_R\gamma^\mu d_R)(\bar{\nu}_\mu\gamma_\mu(1-\gamma_5)\nu_\mu)$	$\mathbf{C}$
CR_sdnutaunutau	$\frac{4G_F}{\sqrt{2}}V_{td}V_{ts}^*\frac{e^2}{16\pi^2}(\bar{s}_R\gamma^\mu d_R)(\bar{\nu}_\tau\gamma_\mu(1-\gamma_5)\nu_ au)$	$\mathbf{C}$
CR_sdnuenumu	$\frac{4G_F}{\sqrt{2}}V_{td}V_{ts}^*\frac{e^2}{16\pi^2}(\bar{s}_R\gamma^{\mu}d_R)(\bar{\nu}_{\mu}\gamma_{\mu}(1-\gamma_5)\nu_e)$	$\mathbf{C}$

WC name	Operator	Type
CR_sdnumunue	$\frac{4G_F}{\sqrt{2}}V_{td}V_{ts}^* \frac{e^2}{16\pi^2} (\bar{s}_R \gamma^\mu d_R) (\bar{\nu}_e \gamma_\mu (1-\gamma_5) \nu_\mu)$	С
${\tt CR\_sdnumunutau}$	$rac{4G_F}{\sqrt{2}}V_{td}V_{ts}^*rac{e^2}{16\pi^2}(ar{s}_R\gamma^\mu d_R)(ar{ u}_ au\gamma_\mu(1-\gamma_5) u_\mu)$	$\mathbf{C}$
CR_sdnutaunumu	$rac{4G_F}{\sqrt{2}}V_{td}V_{ts}^*rac{e^2}{16\pi^2}(ar{s}_R\gamma^{\mu}d_R)(ar{ u}_{\mu}\gamma_{\mu}(1-\gamma_5) u_{ au})$	$\mathbf{C}$
CR_sdnuenutau	$\frac{4G_F}{\sqrt{2}}V_{td}V_{ts}^* \frac{e^2}{16\pi^2} (\bar{s}_R \gamma^\mu d_R) (\bar{\nu}_\tau \gamma_\mu (1 - \gamma_5) \nu_e)$	$\mathbf{C}$
CR_sdnutaunue	$\frac{\sqrt{2}}{\sqrt{2}} V_{td} V_{ts}^* \frac{e^2}{16\pi^2} (\bar{s}_R \gamma^{\mu} d_R) (\bar{\nu}_e \gamma_{\mu} (1 - \gamma_5) \nu_{\tau})$	$\mathbf{C}$

#### usenu

WC name	Operator	Type
CVL_suenue	$-\frac{4G_F}{\sqrt{2}}V_{us}(\bar{u}_L\gamma^{\mu}s_L)(\bar{e}_L\gamma_{\mu}\nu_{eL})$	C
CVR_suenue	$-rac{4ar{Q}_F^2}{\sqrt{2}}V_{us}(ar{u}_R\gamma^\mu s_R)(ar{e}_L\gamma_\mu u_{eL})$	$\mathbf{C}$
CSR_suenue	$-\frac{4\tilde{G}_F}{\sqrt{2}}V_{us}(\bar{u}_L s_R)(\bar{e}_R \nu_{eL})$	$\mathbf{C}$
CSL_suenue	$-\frac{4\widetilde{G}_F}{\sqrt{2}}V_{us}(\bar{u}_Rs_L)(\bar{e}_R u_{eL})$	$^{\mathrm{C}}$
CT_suenue	$-rac{4G_F}{\sqrt{2}}V_{us}(ar{u}_R\sigma^{\mu u}s_L)(ar{e}_R\sigma_{\mu u} u_{eL})$	$\mathbf{C}$
CVL_suenumu	$-rac{4G_F}{\sqrt{2}}V_{us}(ar{u}_L\gamma^\mu s_L)(ar{e}_L\gamma_\mu u_{\mu L})$	$\mathbf{C}$
CVR_suenumu	$-rac{4ar{G_F}}{\sqrt{2}}V_{us}(ar{u}_R\gamma^\mu s_R)(ar{e}_L\gamma_\mu u_{\mu L})$	$^{\mathrm{C}}$
CSR_suenumu	$-\frac{4\check{G}_F}{\sqrt{2}}V_{us}(\bar{u}_Ls_R)(\bar{e}_R\nu_{\mu L})$	$^{\mathrm{C}}$
CSL_suenumu	$-rac{4ar{Q}_F^2}{\sqrt{2}}V_{us}(ar{u}_Rs_L)(ar{e}_R u_{\mu L})$	$^{\mathrm{C}}$
CT_suenumu	$-rac{4ar{Q}_F^2}{\sqrt{2}}V_{us}(ar{u}_R\sigma^{\mu u}s_L)(ar{e}_R\sigma_{\mu u} u_{\mu L})$	$^{\mathrm{C}}$
CVL_suenutau	$-rac{4ar{Q}_F^C}{\sqrt{2}}V_{us}(ar{u}_L\gamma^\mu s_L)(ar{e}_L\gamma_\mu u_{ au L})$	$\mathbf{C}$
CVR_suenutau	$-rac{4ar{Q}_F^2}{\sqrt{2}}V_{us}(ar{u}_R\gamma^\mu s_R)(ar{e}_L\gamma_\mu u_{ au L})$	$\mathbf{C}$
CSR_suenutau	$-rac{4ar{Q}_F^2}{\sqrt{2}}V_{us}(ar{u}_Ls_R)(ar{e}_R u_{ au L})$	$^{\mathrm{C}}$
CSL_suenutau	$-rac{4ar{Q}_F^2}{\sqrt{2}}V_{us}(ar{u}_Rs_L)(ar{e}_R u_{ au L})$	$^{\mathrm{C}}$
CT_suenutau	$-rac{4reve{G}_F}{\sqrt{2}}V_{us}(ar{u}_R\sigma^{\mu u}s_L)(ar{e}_R\sigma_{\mu u} u_{ au L})$	C

#### usmunu

WC name	Operator	Type
CVL_sumunue	$-\frac{4G_F}{\sqrt{2}}V_{us}(\bar{u}_L\gamma^\mu s_L)(\bar{\mu}_L\gamma_\mu\nu_{eL})$	C
CVR_sumunue	$-\frac{4G_F}{\sqrt{2}}V_{us}(\bar{u}_L\gamma^{\mu}s_L)(\bar{\mu}_L\gamma_{\mu}\nu_{eL})$ $-\frac{4G_F}{\sqrt{2}}V_{us}(\bar{u}_R\gamma^{\mu}s_R)(\bar{\mu}_L\gamma_{\mu}\nu_{eL})$	$\mathbf{C}$
CSR_sumunue	$-\frac{4G_F}{\sqrt{2}}V_{us}(\bar{u}_L s_R)(\bar{\mu}_R \nu_{eL})$	$\mathbf{C}$
CSL_sumunue	$-\frac{4G_F}{\sqrt{2}}V_{us}(\bar{u}_L s_R)(\bar{\mu}_R \nu_{eL}) \\ -\frac{4G_F}{\sqrt{2}}V_{us}(\bar{u}_R s_L)(\bar{\mu}_R \nu_{eL}) \\ -\frac{4G_F}{\sqrt{2}}V_{us}(\bar{u}_R \sigma^{\mu\nu} s_L)(\bar{\mu}_R \sigma_{\mu\nu} \nu_{eL})$	$\mathbf{C}$
CT_sumunue	$-rac{4ar{G}_F}{\sqrt{2}}V_{us}(ar{u}_R\sigma^{\mu u}s_L)(ar{\mu}_R\sigma_{\mu u} u_{eL})$	$\mathbf{C}$
CVL_sumunumu	$-rac{4 ar{G_F}}{\sqrt{2}} V_{us} (ar{u}_L \gamma^\mu s_L) (ar{\mu}_L \gamma_\mu  u_{\mu L})$	$\mathbf{C}$
CVR_sumunumu	$-rac{4\check{G_F}}{\sqrt{2}}V_{us}(ar{u}_R\gamma^\mu s_R)(ar{\mu}_L\gamma_\mu u_{\mu L})$	$\mathbf{C}$

WC name	Operator	Type
CSR_sumunumu	$-\frac{4G_F}{\sqrt{2}}V_{us}(\bar{u}_L s_R)(\bar{\mu}_R \nu_{\mu L})$	C
CSL_sumunumu	$-\frac{4G_F}{\sqrt{2}}V_{us}(\bar{u}_Rs_L)(\bar{\mu}_R\nu_{\mu L})$	$\mathbf{C}$
CT_sumunumu	$-\frac{4G_F}{\sqrt{2}}V_{us}(\bar{u}_R\sigma^{\mu\nu}s_L)(\bar{\mu}_R\sigma_{\mu\nu}\nu_{\mu L})$	$\mathbf{C}$
CVL_sumunutau	$-rac{4\widetilde{Q}_F^2}{\sqrt{2}}V_{us}(ar{u}_L\gamma^\mu s_L)(ar{\mu}_L\gamma_\mu u_{ au L})$	$\mathbf{C}$
CVR_sumunutau	$-rac{4ar{G_F}}{\sqrt{2}}V_{us}(ar{u}_R\gamma^\mu s_R)(ar{\mu}_L\gamma_\mu u_{ au L})$	$\mathbf{C}$
CSR_sumunutau	$-rac{4ar{G_F}}{\sqrt{2}}V_{us}(ar{u}_L s_R)(ar{\mu}_R  u_{ au L})$	$\mathbf{C}$
CSL_sumunutau	$-rac{4ar{G_F}}{\sqrt{2}}V_{us}(ar{u}_Rs_L)(ar{\mu}_R u_{ au L})$	$\mathbf{C}$
CT_sumunutau	$-rac{4G_F}{\sqrt{2}}V_{us}(ar{u}_R\sigma^{\mu u}s_L)(ar{\mu}_R\sigma_{\mu u} u_{ au L})$	$\mathbf{C}$

### udenu

WC name	Operator	Type
CVL_duenue	$-\frac{4G_F}{\sqrt{2}}V_{ud}(\bar{u}_L\gamma^{\mu}d_L)(\bar{e}_L\gamma_{\mu}\nu_{eL})$	C
CVR_duenue	$-rac{4\widetilde{G}_F^2}{\sqrt{2}}V_{ud}(ar{u}_R\gamma^\mu d_R)(ar{e}_L\gamma_\mu u_{eL})$	$\mathbf{C}$
CSR_duenue	$-rac{4\widetilde{G_F}}{\sqrt{2}}V_{ud}(\bar{u}_Ld_R)(\bar{e}_R u_{eL})$	$^{\mathrm{C}}$
CSL_duenue	$-rac{4\widetilde{G_F}}{\sqrt{2}}V_{ud}(\bar{u}_Rd_L)(\bar{e}_R u_{eL})$	$\mathbf{C}$
CT_duenue	$-rac{4raket{G_F}}{\sqrt{2}}V_{ud}(ar{u}_R\sigma^{\mu u}d_L)(ar{e}_R\sigma_{\mu u} u_{eL})$	$\mathbf{C}$
CVL_duenumu	$-rac{4\widetilde{G_F}}{\sqrt{2}}V_{ud}(\bar{u}_L\gamma^\mu d_L)(\bar{e}_L\gamma_\mu u_{\mu L})$	$\mathbf{C}$
CVR_duenumu	$-rac{4\widetilde{G_F}}{\sqrt{2}}V_{ud}(\bar{u}_R\gamma^\mu d_R)(\bar{e}_L\gamma_\mu u_{\mu L})$	$\mathbf{C}$
CSR_duenumu	$-rac{4\widetilde{G_F}}{\sqrt{2}}V_{ud}(ar{u}_Ld_R)(ar{e}_R u_{\mu L})$	$\mathbf{C}$
CSL_duenumu	$-rac{4rac{rack{G_F}}{\sqrt{2}}}{\sqrt{2}}V_{ud}(ar{u}_Rd_L)(ar{e}_R u_{\mu L})$	$\mathbf{C}$
CT_duenumu	$-rac{4rac{G_F}{\sqrt{2}}}{\sqrt{2}}V_{ud}(ar{u}_R\sigma^{\mu u}d_L)(ar{e}_R\sigma_{\mu u} u_{\mu L})$	$^{\mathrm{C}}$
CVL_duenutau	$-rac{4reve{G_F}}{\sqrt{2}}V_{ud}(ar{u}_L\gamma^\mu d_L)(ar{e}_L\gamma_\mu u_{ au L})$	$^{\mathrm{C}}$
CVR_duenutau	$-rac{4rac{arphi_F}{\sqrt{2}}}{\sqrt{2}}V_{ud}(ar{u}_R\gamma^\mu d_R)(ar{e}_L\gamma_\mu u_{ au L})$	$\mathbf{C}$
CSR_duenutau	$-rac{4rac{arphi_F}{\sqrt{2}}}{\sqrt{2}}V_{ud}(ar{u}_Ld_R)(ar{e}_R u_{ au L})$	$\mathbf{C}$
CSL_duenutau	$-rac{4rakety_T^2}{\sqrt{2}}V_{ud}(ar{u}_Rd_L)(ar{e}_R u_{ au L})$	$\mathbf{C}$
CT_duenutau	$-rac{4\widetilde{G}_F}{\sqrt{2}}V_{ud}(ar{u}_R\sigma^{\mu u}d_L)(ar{e}_R\sigma_{\mu u} u_{ au L})$	$\mathbf{C}$

## udmunu

WC name	Operator	Type
CVL_dumunue	$-\frac{4G_F}{\sqrt{2}}V_{ud}(\bar{u}_L\gamma^{\mu}d_L)(\bar{\mu}_L\gamma_{\mu}\nu_{eL}) \\ -\frac{4G_F}{\sqrt{2}}V_{ud}(\bar{u}_R\gamma^{\mu}d_R)(\bar{\mu}_L\gamma_{\mu}\nu_{eL}) \\ -\frac{4G_F}{\sqrt{2}}V_{ud}(\bar{u}_Ld_R)(\bar{\mu}_R\nu_{eL}) \\ -\frac{4G_F}{\sqrt{2}}V_{ud}(\bar{u}_Rd_L)(\bar{\mu}_R\nu_{eL})$	С
CVR_dumunue	$-rac{4ar{G_F}}{\sqrt{2}}V_{ud}(ar{u}_R\gamma^\mu d_R)(ar{\mu}_L\gamma_\mu u_{eL})$	$\mathbf{C}$
CSR_dumunue	$-rac{4ar{G_F}}{\sqrt{2}}V_{ud}(ar{u}_Ld_R)(ar{\mu}_R u_{eL})$	$\mathbf{C}$
CSL_dumunue	$-rac{4reve{G_F}}{\sqrt{2}}V_{ud}(ar{u}_Rd_L)(ar{\mu}_R u_{eL})$	$\mathbf{C}$

WC name	Operator	Type
CT_dumunue	$-\frac{4G_F}{\sqrt{2}}V_{ud}(\bar{u}_R\sigma^{\mu\nu}d_L)(\bar{\mu}_R\sigma_{\mu\nu}\nu_{eL})$	$^{\mathrm{C}}$
CVL_dumunumu	$-rac{4ec{Q}_F^2}{\sqrt{2}}V_{ud}(ar{u}_L\gamma^\mu d_L)(ar{\mu}_L\gamma_\mu u_{\mu L})$	$^{\mathrm{C}}$
CVR_dumunumu	$-\frac{4G_F}{\sqrt{2}}V_{ud}(\bar{u}_R\gamma^\mu d_R)(\bar{\mu}_L\gamma_\mu\nu_{\mu L})$	$\mathbf{C}$
CSR_dumunumu	$-rac{4reve{G_F}}{\sqrt{2}}V_{ud}(ar{u}_Ld_R)(ar{\mu}_R u_{\mu L})$	$\mathbf{C}$
CSL_dumunumu	$-rac{4\overset{.}{G_F}}{\sqrt{2}}V_{ud}(ar{u}_Rd_L)(ar{\mu}_R u_{\mu L})$	$\mathbf{C}$
CT_dumunumu	$-rac{4G_F}{\sqrt{2}}V_{ud}(ar{u}_R\sigma^{\mu u}d_L)(ar{\mu}_R\sigma_{\mu u} u_{\mu L})$	$\mathbf{C}$
CVL_dumunutau	$-rac{4G_F}{\sqrt{2}}V_{ud}(\bar{u}_L\gamma^\mu d_L)(\bar{\mu}_L\gamma_\mu u_{ au L})$	$\mathbf{C}$
CVR_dumunutau	$-rac{4G_F}{\sqrt{2}}V_{ud}(ar{u}_R\gamma^\mu d_R)(ar{\mu}_L\gamma_\mu u_{ au L})$	$\mathbf{C}$
CSR_dumunutau	$-rac{4G_F}{\sqrt{2}}V_{ud}(ar{u}_Ld_R)(ar{\mu}_R u_{ au L})$	$\mathbf{C}$
CSL_dumunutau	$-rac{4G_F}{\sqrt{2}}V_{ud}(ar{u}_Rd_L)(ar{\mu}_R u_{ au L})$	$\mathbf{C}$
CT_dumunutau	$-rac{4ar{G}_F}{\sqrt{2}}V_{ud}(ar{u}_R\sigma^{\mu u}d_L)(ar{\mu}_R\sigma_{\mu u} u_{ au L})$	$\mathbf{C}$