

# $\delta$ -Renormalization Scheme ( $\mathcal{R}_\delta$ scheme)

In dim. reg.  $1/\epsilon$  poles come in powers of [Bollini & Gambiagi, 't Hooft & Veltman, '72]

$$\ln \frac{\mu^2}{\Lambda^2} + \frac{1}{\epsilon} + c$$

In the **modified minimal subtraction** scheme ( $\overline{\text{MS}}$ ) one subtracts together with the pole a constant [Bardeen, Buras, Duke, Muta (1978) on DIS results]:

$$\ln(4\pi) - \gamma_E$$

This corresponds to a shift in the scale:

$$\mu_{\overline{\text{MS}}}^2 = \mu^2 \exp(\ln 4\pi - \gamma_E)$$

A finite subtraction from infinity is arbitrary. *Let's make use of this!*

Subtract an arbitrary constant and keep it in your calculation:  $\mathcal{R}_\delta$ -scheme

$$\ln(4\pi) - \gamma_E - \delta,$$

$$\mu_\delta^2 = \mu_{\overline{\text{MS}}}^2 \exp(-\delta) = \mu^2 \exp(\ln 4\pi - \gamma_E - \delta)$$