# Supplemental Material to the article “Upper critical fields in two-band $SrFe_{2-x}Ni_xAs_2$ superconductor”

The two-band model in the “dirty limit” with taking into account the orbital interaction and a small interband interaction has the following form:

$$a_1(\ln t + U(h)) + a_2(\ln t + U(\eta h)) + a_0(\ln t + U(h))(\ln t + U(\eta h)) = 0,$$

where
$t = T/T_c$ – normalized temperature,
$h = D_1 \hbar H / 2\phi_0 k_B T$ – dimensionless magnetic field,
$D_n$ – charge carriers diffusion coefficient in the normal state due to scattering on non-magnetic impurities,
$\eta = D_2/D_1$ – the diffusion coefficients ratio (it lets to compare the scattering between the zones),
$a_1 = 1 + \lambda_-/\lambda_0$, $a_2 = 1 - \lambda_-/\lambda_0$, $a_0 = 2w/\lambda_0$,
$\lambda_- = \lambda_{11} - \lambda_{22}$, $\lambda_0 = \sqrt{\lambda_-^2 + 4\lambda_{12}\lambda_{21}}$, $w = \lambda_{11}\lambda_{22} - \lambda_{12}\lambda_{21}$,
$\lambda$ – the pairing constants matrix, whose diagonal elements describe the intraband pairing, and the side diagonal elements describe interband pairing,
$U(x) = \psi\left(x + \frac{1}{2}\right) - \psi(1/2)$, $\psi(x)$ – digamma function.

In order to reduce the number of the free parameters in the approximation, we used the condition $\lambda_{12} = \lambda_{21}$.