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Manual for CSEM Inversion code, SALAMANDER

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Outlines

1. Input parameters for inversion

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[itype\_roughness]

* Choice of regularization is done by the parameter, itype\_roughness.
* Roughness matrices are inverted and used in the data-space scheme.

itype\_roughness = 1 : SM, smoothest model (Usui et al., 2017)

itype\_roughness = 2 : MS, minimum support (Grayver et al., 2013)

itype\_roughness = 3 : MSG, minimum support gradient (Xiang et al., 2017)

itype\_roughness = 4 : MGS, minimum gradient support (Zhang et al., 2012)

Except SM, beta parameter should be given just after itype\_roughness is given.

[ialphaflag]

* Choice for how to select alpha (trade-off) parameter of regularization term

ialphaflag = 1 : L-curve method (Usui et al., 2017)

nalpha : # of alpha

alpha(1: nalpha) : alpha for L-curve

ialphaflag = 2 : Cooling strategy (Schwartzbach and Haber, 2013) with given alpha

# alpha = initial alpha \* 10\*\*(-1/3) when data misfit didn’t decrease by 10 %

initial alpha

ialphaflag = 3 : Generalized cooling strategy (Minami et al, 2018)

# alpha = initial alpha \* 10\*\*(-1/3) when data misfit didn’t decrease by 10 %

# initial alpha = 10^3\*rho(J[Bm^-1][J^T])/rho(Wd^TWd)

<The followings are planned>

ialphaflag = 4 : Spectral ratio used all the iteration (Grayver et al., 2013) (under construction)

# alpha = spectral radius of (JBm^-1J^T) /spectral radius of (Wd^-1)

ialphaflag = 5 : Adaptive method (Zhang et al., 2012) (under construction)

# alpha = [spectral radius of (Wd)] \*0.9 (l < 5) or \*0.1 ( l > 6) when

alpha\_init : initial value of alpha