Algorithm 1: MS-MFS, as implemented in CASA.

Data: calibrated visibilities: $\boldsymbol{V}^{\mathrm{obs}}_{\nu} \;\; \forall \nu$
Data: *uv*-sampling function and weights: $[\mathsf{S}_{\nu}], [\mathsf{W}^{\mathrm{im}}_{\nu}]$
Data: input: number of Taylor-terms N_{t}, number of scales N_{s}
Data: input: image noise threshold, σ_{thr}, loop gain g
Data: input: scale basis functions: $\boldsymbol{I}^{\mathrm{shp}}_{s} \; \forall s \in \{0, N_{\mathrm{s}}-1\}$
Data: input: reference frequency ν_0 to compute $w_{\nu} = \left(\frac{\nu-\nu_0}{\nu_0}\right)$
Result: model coefficient images: $\boldsymbol{I}^{\mathrm{m}}_{t} \; \forall t \in \{0, N_{\mathrm{t}}-1\}$
Result: intensity, spectral index and curvature: $\boldsymbol{I}^{\mathrm{m}}_{\nu_0}, \boldsymbol{I}^{\mathrm{m}}_{\alpha}, \boldsymbol{I}^{\mathrm{m}}_{\beta}$

for $t \in \{0, N_{\mathrm{t}}-1\}, q \in \{t, N_{\mathrm{t}}-1\}$ **do**
    Compute the spectral Hessian kernel $\boldsymbol{I}^{\mathrm{psf}}_{tq} = \sum_{\nu} w^{t+q}_{\nu} \boldsymbol{I}^{\mathrm{psf}}_{\nu}$
    for $s \in \{0, N_{\mathrm{s}}-1\}, p \in \{s, N_{\mathrm{s}}-1\}$ **do**
        Compute scale-spectral kernels $\boldsymbol{I}^{\mathrm{psf}}_{sp,tq} = \boldsymbol{I}^{\mathrm{shp}}_{s} \star \boldsymbol{I}^{\mathrm{shp}}_{p} \star \boldsymbol{I}^{\mathrm{psf}}_{tq}$
    end
end
for $s \in \{0, N_{\mathrm{s}}-1\}$ **do**
    Construct $[\mathsf{H}^{\mathrm{peak}}_{s}]$ from $mid(\boldsymbol{I}^{\mathrm{psf}}_{s,s,t,q})$ and compute $[\mathsf{H}^{\mathrm{peak}^{-1}}_{s}]$
end
Initialize the model $\boldsymbol{I}^{\mathrm{m}}_{t}$ for all $t \in \{0, N_{\mathrm{t}}-1\}$

repeat /* Major Cycle */
    for $t \in \{0, N_{\mathrm{t}}\text{-}1\}$ **do**
        Compute $\boldsymbol{I}^{\mathrm{res}}_{t} = \sum_{\nu} w^{t}_{\nu} \boldsymbol{I}^{\mathrm{res}}_{\nu}$ from residual visibilities $\boldsymbol{V}^{\mathrm{res}}_{\nu}$
        for $s \in \{0, N_{\mathrm{s}}\text{-}1\}$ **do**
            Convolve with sth scale-function $\boldsymbol{I}^{\mathrm{res}}_{s,t} = \boldsymbol{I}^{\mathrm{shp}}_{s} \star \boldsymbol{I}^{\mathrm{res}}_{t}$
        end
    end
    Calculate minor-cycle threshold f_{limit} from $\boldsymbol{I}^{\mathrm{res}}_{0,0}$
    repeat /* Minor Cycle */
        for $s \in \{0, N_{\mathrm{s}}\text{-}1\}$ **do**
            foreach *pixel* **do**
                Construct $\boldsymbol{I}^{\mathrm{rhs}}_{s}$, an $N_{\mathrm{t}} \times 1$ vector from $\boldsymbol{I}^{\mathrm{res}}_{s,t} \;\; \forall \; t \in \{0, N_{\mathrm{t}}\text{-}1\}$
                Compute principal solution $\boldsymbol{I}^{\mathrm{sol}}_{s} = [\mathsf{H}^{\mathrm{peak}^{-1}}_{s}] \boldsymbol{I}^{\mathrm{rhs}}_{s}$
                Fill solution $\boldsymbol{I}^{\mathrm{sol}}_{s}$ into model images $\forall t$: $\boldsymbol{I}^{\mathrm{m,sol}}_{s,t}$
            end
            Choose $\boldsymbol{I}^{\mathrm{m}}_{p,t} = max\{\boldsymbol{I}^{\mathrm{m,sol}}_{s,t=0}, \; \forall \; s \in \{0, N_{\mathrm{s}}\text{-}1\}\}$
        end
        for $t \in \{0, N_{\mathrm{t}}-1\}$ **do**
            Update the model image: $\boldsymbol{I}^{\mathrm{m}}_{t} = I^{\mathrm{m}}_{t} + g\,[\boldsymbol{I}^{\mathrm{shp}}_{p} \star \boldsymbol{I}^{\mathrm{m}}_{p,t}]$
            for $s \in \{0, N_{\mathrm{s}}\text{-}1\}$ **do**
                Update the residual image:
                $\boldsymbol{I}^{\mathrm{res}}_{s,t} = \boldsymbol{I}^{\mathrm{res}}_{s,t} - g \; \sum_{q=0}^{N_{\mathrm{t}}-1} [\boldsymbol{I}^{\mathrm{psf}}_{sp,tq} \star \boldsymbol{I}^{\mathrm{m}}_{p,t}]$
            end
        end
    until *Peak residual in* $\boldsymbol{I}^{\mathrm{res}}_{0,0} < f_{\mathrm{limit}}$
    Compute model visibilities $\boldsymbol{V}^{\mathrm{m}}_{\nu}$ from $\boldsymbol{I}^{\mathrm{m}}_{t} \; \forall t \in \{0.N_{\mathrm{t}}-1\}$
    Compute residual visibilities $\boldsymbol{V}^{\mathrm{res}}_{\nu} = \boldsymbol{V}^{\mathrm{obs}}_{\nu} - \boldsymbol{V}^{\mathrm{m}}_{\nu}$
until *Peak residual in* $\boldsymbol{I}^{\mathrm{res}}_{0} < \sigma_{\mathrm{thr}}$

Restore the model Taylor-coefficients $\boldsymbol{I}^{\mathrm{m}}_{t} \; \forall t \in \{0.N_{\mathrm{t}}-1\}$
Calculate $\boldsymbol{I}^{\mathrm{m}}_{\nu_0}, \boldsymbol{I}^{\mathrm{m}}_{\alpha}, \boldsymbol{I}^{\mathrm{m}}_{\beta}$ from $\boldsymbol{I}^{\mathrm{m}}_{t} \; \forall t \in \{0.N_{\mathrm{t}}-1\}$
If required, remove average primary beam:
$\boldsymbol{I}^{\mathrm{new}}_{\nu_0} = \boldsymbol{I}^{\mathrm{m}}_{\nu_0} / \boldsymbol{P}_{\nu_0}; \boldsymbol{I}^{\mathrm{new}}_{\alpha} = \boldsymbol{I}^{\mathrm{m}}_{\alpha} - \boldsymbol{P}_{\alpha}; \boldsymbol{I}^{\mathrm{new}}_{\beta} = \boldsymbol{I}^{\mathrm{m}}_{\beta} - \boldsymbol{P}_{\beta}$