

# Instructions for Jules

To run Jules at a single point, we need to specify the parameters for tupp, alpha, fd\_io, f0, height, and lai in the namelist files.

The "pftparams.nm" file will receive the tupp, alpha, fd\_io, f0, and height parameters. We will only change the settings for the first plant function type. The alpha\_io will be the first numerical value on that line:

```
alpha_io=x,0.06,0.08,0.08,0.10,0.06,0.040,0.06,0.08,
```

The value  $x$  needs to be replaced by the desired value.

For the canopy height:

```
canht_ft_io=x,19.01,19.01,16.38,16.38,0.79,1.26,1.00,1.00,
```

For the f0\_io:

```
f0_io={:.4f},0.892,0.875,0.875,0.936,0.931,0.800,0.950,0.950,
```

For the fd\_io:

```
fd_io={:.4f},0.010,0.010,0.015,0.015,0.019,0.019,0.015,0.015,
```

For the tupp:

```
tupp_io={:.1f},43.0,43.0,37.0,36.0,32.0,45.0,36.0,36.0,
```

For the lai, the file will be "initial\_conditions.nml", and the value will be inserted in the line:

```
const_val=0.0,1.0,0.0,296.78,286.78,0.9,x,30.0
```

All other configurations will be shown in the "JulesNamelistFolder" located in the current document's directory.

We will show two Python functions to write these values to files:

```
def Save_pft_params(tupp, alpha, fd_io, f0, height):
    text=""&jules_pftparm
    a_wl_io=0.65,0.65,0.65,0.65,0.75,0.005,0.005,0.10,0.10,
    a_ws_io=5*10.00,1.00,1.00,10.00,10.00,
    albsnc_max_io=5*0.15,0.60,0.60,0.40,0.40,
    albsnc_min_io=5*0.30,0.80,0.80,0.80,0.80,
    albsnf_max_io=5*0.10,0.20,0.20,0.20,0.20,
    alnir_io=0.45,0.45,0.45,0.35,0.35,0.58,0.58,0.58,0.58,
    alpar_io=0.07,0.10,0.10,0.07,0.07,0.10,0.10,0.10,0.10,
```

```

alpha_io={:.3f},0.06,0.08,0.08,0.10,0.06,0.040,0.06,0.08,
b_wl_io=9*1.667,
c3_io=6*1,0,1,1,
can_struct_a_io=9*1.0,
canht_ft_io={:.3f},19.01,19.01,16.38,16.38,0.79,1.26,1.00,1.00,
catch0_io=0.5,0.50,0.50,0.50,0.50,0.50,0.50,0.50,0.50,
dcatch_dlai_io=0.05,9*0.05,
dgl_dm_io=9*0.0,
dgl_dt_io=9,4*9.0,0.0,0.0,9.0,9.0,
dqcrit_io=0.09,0.090,0.090,0.060,0.041,0.051,0.075,0.037,0.030,
dz0v_dh_io=0.05,4*0.05,0.10,0.10,0.10,0.10,
emis_pft_io=9*1.00,
eta_sl_io=9*0.01,
f0_io={:.4f},0.892,0.875,0.875,0.936,0.931,0.800,0.950,0.950,
fd_io={:.4f},0.010,0.010,0.015,0.015,0.019,0.019,0.015,0.015,
fsmc_mod_io=9*0,
fsmc_of_io=9*0.00,
fsmc_p0_io=9*0.00,
g_leaf_0_io=0.25,0.50,0.25,0.25,0.25,3.00,3.00,0.66,0.25,
glmin_io=1e-06,8*1.0e-6,
gsoil_f_io=9*1.0,
hw_sw_io=9*0.5,
infil_f_io=5*4.00,2.00,2.00,2.00,2.00,
kext_io=0.5,8*0.50,
kn_io=9*0.78,
knl_io=9*0.2,
kpar_io=0.5,8*0.50,
lai_alb_lim_io=9*0.5,
lai_io=5.3,5.0,5.0,4.0,4.0,2.0,4.0,1.0,1.0,
lma_io=0.1039,0.1403,0.0823,0.2263,0.1006,0.0498,0.1370,0.1515,0.0550,
neff_io=6*0.8e-3,0.4e-3,0.8e-3,0.8e-3,
nl0_io=0.046,0.0460,0.0460,0.0330,0.0330,0.0730,0.0600,0.0600,0.0600,
nmass_io=0.0170,0.0144,0.0210,0.0115,0.0186,0.0219,0.0113,0.0136,0.0238,
nr_io=0.01726,0.01726,0.01726,0.00784,0.00784,0.0162,0.0084,0.01726,0.01726,
nr_nl_io=5*0.67,0.72,0.72,0.67,0.67,
ns_nl_io=5*0.10,1.00,1.00,0.10,0.10,
nsw_io=0.0072,0.0072,0.0072,0.0083,0.0083,0.01604,0.0202,0.0072,0.0072,
omega_io=0.15,0.15,0.15,0.12,0.12,0.16,0.16,0.12,0.15,
omnir_io=0.70,0.70,0.70,0.45,0.45,0.83,0.83,0.83,0.83,
orient_io=9*0,
q10_leaf_io=9*2.00,
r_grow_io=0.15,8*0.25,
rootd_ft_io=3,2.00,2.00,1.80,2.00,0.50,0.50,1.00,1.00,
sigl_io=0.0375,0.0375,0.0375,0.1000,0.100,0.0250,0.0500,0.0500,
tleaf_of_io=273.15,233.15,278.15,233.15,278.15,278.15,278.15,233.15,278.15,
tlow_io=0,13.0,5.0,5.0,-5.0,10.0,13.0,10.0,0.0,

```

```

tupp_io={:.1f},43.0,43.0,37.0,36.0,32.0,45.0,36.0,36.0,
vint_io=7.21,3.90,5.73,6.32,6.32,6.42,0.00,14.71,14.71,
vsl_io=19.22,28.40,29.81,18.15,23.79,40.96,20.48,23.15,23.15,
z0hm_classic_pft_io=9*0.1,
z0hm_pft_io=9*0.1,
/"".format(alpha, max(height, 19.01), f0, fd, tupp)
    with open(r"pft_params.nml","a") as my_file:
        my_file.truncate(0)
        my_file.write(text)

def Save_initial_conditions(lai):
    text=""&jules_initial
    dump_file=.false.,
    total_snow=.true.,
    file='./data/initial_conditions.dat',
    nvars=8,
    var='canopy','cs','snow_tile','t_soil','tstar_tile','sthuf','lai','canht'
    !use_file=.false.,.false.,.false.,.false.,.false.,.true.,.false.,.false.,
    use_file=8*.false.,
    const_val=0.0,1.0,0.0,296.78,286.78,0.9,{:.2f},30.0
    var_name='canopy','cs','snow_tile','t_soil','tstar_tile','sthuf','lai','canht',
    /
    "".format(lai)
    with open(r"initial_conditions.nml","a") as my_file:
        my_file.truncate(0)
        my_file.write(text)

```