

1.4 YOU MAY INCLUDE TEX FILES (EQUATIONS, TABLES), FIGURES

```
!> @addtogroup Photosynthesis
!> @{
!>
!> 2.4.2 Assimilation for C4 plants (Collatz et al., 1991)\n
!! \latexonly
!! \input{diffuco_trans_co2_2.4.2.tex}
!! \endlatexonly
!> @}
!
DO ji = 1, kjpindex
  assimi(ji) = zero
ENDDO
!
IF (nic .GT. 0) THEN
  DO inic=1,nic
    !> @codeinc
    x_1 = - ( vc2(index_calc(inic)) + 0.092 * 2.3* sdown(index_calc(inic)) * &
      ext_coef(jv) * light(jv,jl) )
    x_2 = vc2(index_calc(inic)) * 0.092 * 2.3 * sdown(index_calc(inic)) * &
      ext_coef(jv) * light(jv,jl)
    x_3 = ( -x_1 - sqrt( x_1*x_1 - 4.0 * xc4_1 * x_2 ) ) / (2.0*xc4_1)
    x_4 = - ( x_3 + kt(index_calc(inic)) * leaf_ci(index_calc(inic),jv,jl) * &
      1.0e-6 )
    x_5 = x_3 * kt(index_calc(inic)) * leaf_ci(index_calc(inic),jv,jl) * 1.0e-6
    assimi(index_calc(inic)) = ( -x_4 - sqrt( x_4*x_4 - 4. * xc4_2 * x_5 ) ) / (2.*xc4_2)
    assimi(index_calc(inic)) = assimi(index_calc(inic)) - &
      rt(index_calc(inic))
    !> @endcodeinc
```



2.4.2 Assimilation for C4 plants (Collatz et al., 1991)

The photosynthesis is defined by a pair of nested quadratic equations:

M flux determined by the Rubisco and light limited capacities

Φ fixed equal to 0.83

β fixed equal to 0.93

M smaller root of

$$\Phi \cdot M^2 - M \cdot (V_c(l) + \alpha \cdot Q) + V_c(l) \cdot \alpha \cdot Q = 0 \quad (3.15)$$

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Module Documentation

$C_i(l)$ (leaf_ci) global variable declared in diffuco module

W smaller root of

$$\beta \cdot W^2 - W \cdot (M + k_T \cdot C_i(l) \cdot 10^{-6}) + M \cdot k_T \cdot C_i(l) \cdot 10^{-6} = 0 \quad (3.16)$$

α quantum efficiency

$$\alpha \cdot Q = 0.092 \cdot 2.3 \cdot SW_{down} \cdot k \cdot e^{-k \cdot LAI(l)} \quad (3.17)$$

$$M = \frac{V_c(l) + \alpha \cdot Q - \sqrt{(V_c(l) + \alpha \cdot Q)^2 - 4 \cdot \Phi \cdot V_c(l) \cdot \alpha \cdot Q}}{2 \cdot \Phi} \quad (3.18)$$

$$W = \frac{M + k_T \cdot C_i(l) \cdot 10^{-6} - \sqrt{(M + k_T \cdot C_i(l) \cdot 10^{-6})^2 - 4 \cdot \beta \cdot M \cdot k_T \cdot C_i(l) \cdot 10^{-6}}}{2 \cdot \beta} \quad (3.19)$$

$$A = W - R_T \quad (3.20)$$

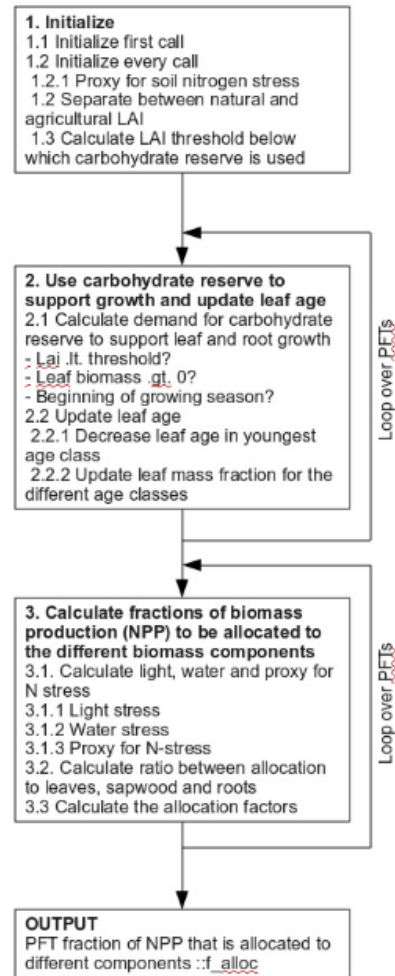
```

x_1 = - ( vc2(index_calc(inic)) + 0.092 * 2.3* sdown(index_calc(inic)) *
&
    ext_coef(jv) * light(jv,jl) )
x_2 = vc2(index_calc(inic)) * 0.092 * 2.3 * sdown(index_calc(inic)) * &
    ext_coef(jv) * light(jv,jl)
x_3 = ( -x_1 - sqrt( x_1*x_1 - 4.0 * xc4_1 * x_2 ) ) / (2.0*xc4_1)
x_4 = - ( x_3 + kt(index_calc(inic)) * leaf_ci(index_calc(inic),jv,jl) *
&
    1.0e-6 )
x_5 = x_3 * kt(index_calc(inic)) * leaf_ci(index_calc(inic),jv,jl) * 1.0e
-6
assimi(index_calc(inic)) = ( -x_4 - sqrt( x_4*x_4 - 4. * xc4_2 * x_5 ) )
/ (2.*xc4_2)
assimi(index_calc(inic)) = assimi(index_calc(inic)) - &
    rt(index_calc(inic))

```

- Sharpe, P.J.H., and Rykiel, E.J. (1991), Modelling integrated response of plants to multiple stresses. In: Response of Plants to Multiple Stresses (eds Mooney, H.A., Winner, W.E., Pell, E.J.), pp. 205-224, Academic Press, San Diego, CA.

FLOWCHART :



A lot is described here:

<http://forge.ipsl.jussieu.fr/orchidee/wiki/OrchideeDocumentation>

1. Add path to the doxygen binary (1.6.2)

```
setenv PATH /home/users/mmancip/PROG/bin:$PATH
if ! ($?LD_LIBRARY_PATH) then
    setenv LD_LIBRARY_PATH /home/users/mmancip/PROG/lib
else
    setenv LD_LIBRARY_PATH /home/users/mmancip/PROG/lib:${LD_LIBRARY_PATH}
endif
```

2. Get some scripts

```
alias recup_TOOLS 'svn co svn://forge.ipsl.jussieu.fr/orchidee/trunk/TOOLS'
recup_TOOLS
```

3. Get standard architecture

```
alias svn_ano 'svn co http://forge.ipsl.jussieu.fr/igcmg/svn/modipsl/trunk'
svn_ano
```

4. Get Martial's personal branch

```
cd util
../TOOLS/recup_my_ORCHIDEE login_svn perso/martial.mancip my_email
```

Enter your password when asked for (several times).



2.1 HOW TO USE DOXYGEN (CONTINUED)

5. Create makefiles

```
./ins_make -v
```

6. Compile documentation

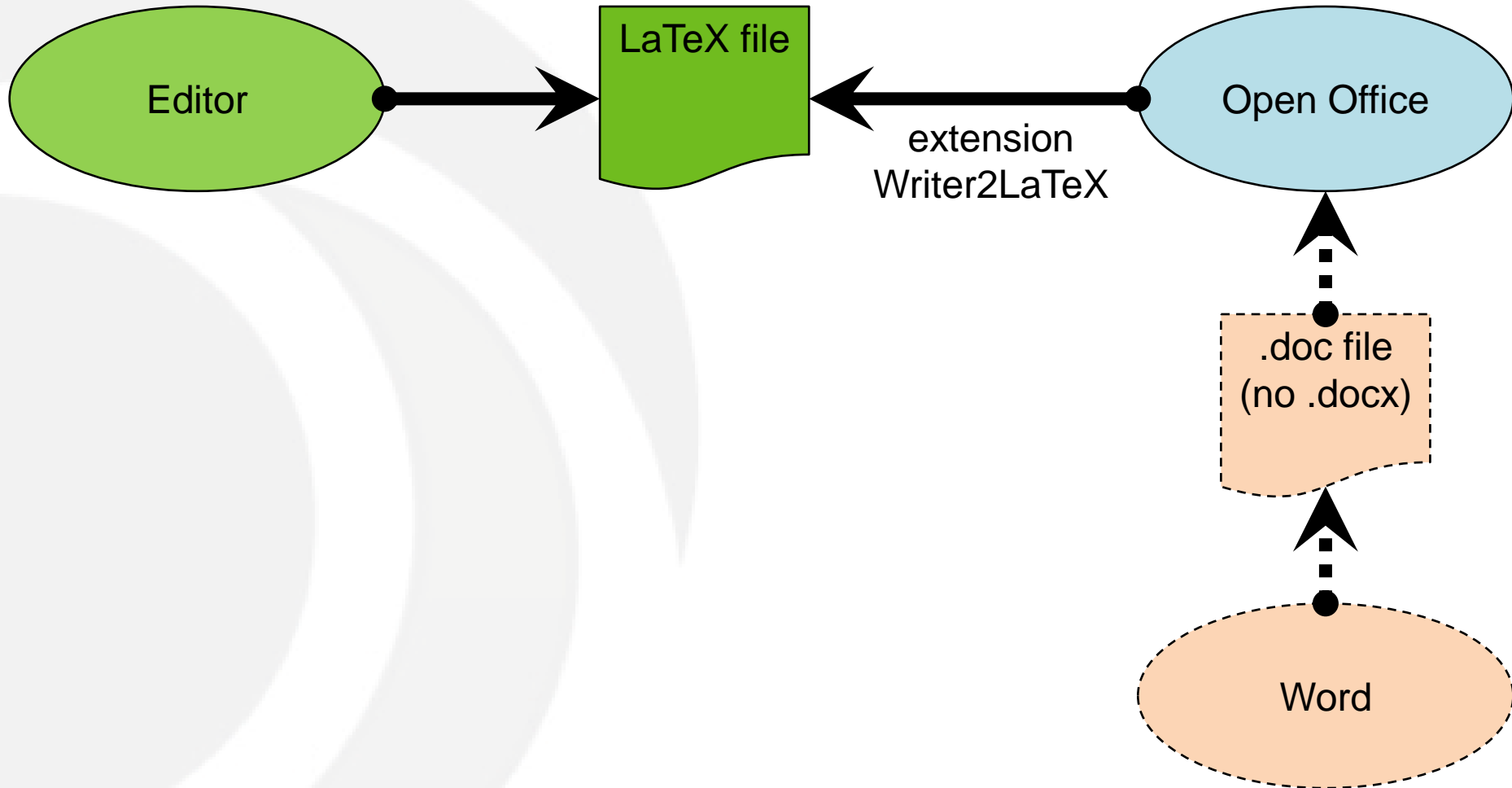
```
cd ../modeles/ORCHIDEE  
./makeorchidee_fcm -rmdoc -doc
```

→ Creation of modeles/ORCHIDEE/docs/

latex/refman.pdf
html/index.html



2.2 SUPPLEMENTARY TOOLS



- Start working on the content as soon as possible.
- Meet regularly with your binomial/trinomial.
- You can send files to the Documentation group for testing.

