**ANNEX**: Details of the mathematical model

1) Actual flow in the dead volume measured with a MFC and corrected for the pressure.

*Factual = Fstd P/Pstd*

2) Pressure-dependent diffusivity

*D*[cm2/s]= 0.0612 x 10 /*P* [bar] From Bogatyrev and Nezovitina et al. (2012)

3) Initial values

*t0 = 0.01s; xpeak = 0; C0 = m0/V0 = m0/(2hA*)

*C0, m0, V, h, A*: initial concentration and mass; volume, half width and cross section area of the CO2 injection.

4) Variables for present iteration *i* and transformation of coordinates

*ui, , t, dt*: linear velocity, volumetric flow. Time is changing at time steps in each iteration.

*xpeak*[*i*]*, xpeak*[*i-1*]*, x, x’, L, L’:* drift corresponding to the present iteration, drift of the preceding iteration, axial coordinate, axial traveling coordinate used for plotting the concentration, dead volume length, dead volume in traveling coordinates.

5) Concentration profile at iteration *i*, time *t* and axial position.

6) Calculation of mass *mi* for present iteration.

it is easier to track *mi*, starting from *m0*, instead of integrating. However, we did the integration to check if the calculation and programming were accurate and consistent.

7) Mass flow and mass loss

8) Calculation of remaining mass for next iteration (*mi+1*) and adjustment of integration constant (*C0*).

9) Go to step 4 and repeat until desired final *t*.