This is alpha equation:

$$\frac{\partial \alpha_1}{\partial t} + \nabla \cdot \left(\mathbf{U} \alpha_1 \right) + \nabla \cdot \left[\mathbf{U_r} \alpha_1 \left(1 - \alpha_1 \right) \right]$$
$$= \alpha_1 \dot{v}_{v\alpha} + \left(1 - \alpha_1 \right) \dot{v}_{c\alpha} = \left(\dot{v}_{v\alpha} - \dot{v}_{c\alpha} \right) \alpha_1 + \dot{v}_{c\alpha}$$
$$= S_p \alpha_1 + S_u$$

ABOUT Explicitly solving alpha equation:

$$\frac{\partial \alpha_1}{\partial t} + \nabla \cdot \left(\mathbf{U} \alpha_1 \right) + \nabla \cdot \left[\mathbf{U_r} \alpha_1 \left(1 - \alpha_1 \right) \right]$$
$$= \left(\dot{v}_{v\alpha} - \dot{v}_{c\alpha} \right) \alpha_1 + \dot{v}_{c\alpha} = S_p \alpha_1 + S_u$$

Discretize the equation as:

$$\frac{\alpha_1 - \alpha_1^0}{\Delta t} + \frac{\int \nabla \cdot \left(\mathbf{U} \alpha_1 \right) dV}{\Delta V} + \frac{\int \nabla \cdot \left[\mathbf{U_r} \alpha_1 \left(1 - \alpha_1 \right) \right] dV}{\Delta V} = S_p \alpha_1 + S_u$$

And explicit solution is [this is what is done in function of MULE::explicitSolve()]

$$\alpha_1 = \frac{\frac{\alpha_1^0}{\Delta t} + S_u - \frac{\int \nabla \cdot \left(\mathbf{U} \alpha_1 \right) dV}{\Delta V} + \frac{\int \nabla \cdot \left[\mathbf{U_r} \alpha_1 \left(1 - \alpha_1 \right) \right] dV}{\Delta V}}{\frac{1}{\Delta t} - S_p}$$

[redundant divU?]
[bug: divU should not appear in Su term]