System of Equations

$$\begin{aligned} \partial_t s &= D\Delta s && \text{in } \Omega_1, \\ -\boldsymbol{n}\cdot D\nabla s &= 1 && \text{at } \partial\Omega^{\text{in}}, \\ \int_{\Omega_1} s dV &= 0 && \text{zero-average constraint} \end{aligned}$$

Ω_1 is the solid phase (labelled 1), $\partial\Omega^{\text{in}}$ is the internal boundary between phases 1 and 0, my variable is s, and D is a diffusivity.

In the code, the zero-average constraint is not input, and rather the value of s at a random point within Ω_1 is constrained instead. The field of s with a zero-average can then be calculated afterwards. Without this, the solution is only unique up to a constant.