Energy conservation equation

Transient term $(\varepsilon\rho_f C_{pf} + (1-\varepsilon)\rho_r C_{pr})\frac{\partial T}{\partial t}$

$+$

Divergence $\nabla \cdot (\rho_f C_{pf} \vec{U} T)$

$=$

Diffusion $\nabla \cdot (k_r \nabla T)$

$+$

Source term 1 $T\nabla \cdot (\rho_f C_{pf} \vec{U})$

$+$

Source term 2 $\frac{\mu_f}{k} \parallel \vec{U} \parallel^2$

$+$

Source term 3 $T\alpha_f \left(\varepsilon \frac{\partial p}{\partial t} + \vec{U} \cdot \nabla p \right)$

OpenFOAM discretization and field operation

```
fvScalarMatrix TEqn
(
  (porosity * rho * Cp + (1.0 - porosity) * rho_rock * cp_rock) * fvm::ddt(T)
  +
  fvm::div(phi * fvc::interpolate(Cp),T)
  ==
  fvm::laplacian(kr,T)
  +
  fvm::Sp(fvc::div(phi * fvc::interpolate(Cp)),T)
  +
  mu/permeability * magSqr(U)
  +
  fvm::Sp(alphaP * (porosity * fvc::ddt(p) + (U & fvc::grad(p))), T)
);

TEqn.solve();
```