**Solution Approach Steps**

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Solve P and T simultaneously

Solve density update

**S**

Solve and update temperature source term

Solve and update species source term

Solve and update reaction term

Update for partial pressures using(P(:,is)) =

Update Mavg, Cp, Hrxn

Convert Mass fraction () to mole fraction (

Solve species equation for the mass fraction

Solve Ergun equation for velocity update