10.3 Thermal Conductivity

Problem: To solve for the temperature distribution in a cylindrical fuel rod.

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$$\frac{1}{r}\frac{d}{dr}\left(rk\frac{dT}{dr}\right)+H=0$$

Materials Properties **Nuclear Properties**

With proper boundary conditions;

$$T-T_s=\frac{HR^2}{4k}\left\{1-\left(\frac{r}{R}\right)^2\right\}$$

Normally assume that H, k independent of r,z

Not True !

Things that effect k

- **Stoichiometry**
- **Pu production and redistribution**
- **Burn up**
- **Porosity**

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Figure - Relative Thermal Conductivities