

## 2.83/2.813 Homework Use Phase

1. According to Ashby refrigeration at 4°C in an A-rated appliance requires 10.5 MJelect/m<sup>3</sup>. Assuming the refrigerator is a 1 meter cube that transfers heat only by conduction through 5 of the 6 surfaces, what would be the equivalent R-factor in units

$$\frac{ft^2 \times ^\circ F}{BTU / hr}$$

2. Compare the performance of the 2008 residential refrigerator in the paper Remanufacturing and Energy Saving, Gutowski et al with Ashby's value. Do they agree?
3. Estimate the energy requirements in MJ for traveling the distance from Boston to San Francisco for a) Toyota Prius, b) a Chevy Tahoe, c) a Boeing 777, d) a train like the Japanese shinkansen.
4. Estimate your travel energy expenditure in MJ for last year.