

Exercise 19

$$\begin{aligned}
 C(S) &\leq \sum_{i=1}^n C^{(i)}(S) \\
 &\leq (1+\epsilon) \sum_{i=1}^n C^{(i)}(S_i^*, S_{-i}) \\
 &\leq (1+\epsilon)\lambda C(S^*) + (1+\epsilon)\mu C(S) \\
 \Leftrightarrow C(S) - (1+\epsilon)\mu C(S) &\leq (1+\epsilon)\lambda C(S^*) \\
 \Leftrightarrow C(S)(1 + (1-\epsilon)\mu) &\leq (1+\epsilon)\lambda C(S^*) \\
 \stackrel{\epsilon < \frac{1}{\mu} - 1}{\Leftrightarrow} \frac{C(S)}{C(S^*)} &\leq \frac{(1+\epsilon)\lambda}{1 - (1+\epsilon)\mu}
 \end{aligned}$$