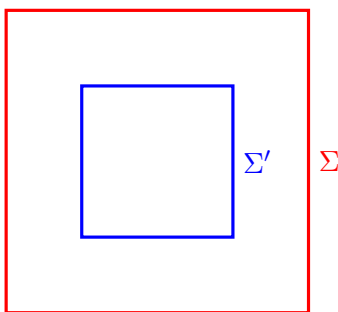


Capacitance of an Interior Region

Consider an arbitrary closed surface Σ , and another closed surface Σ' which is fully contained inside of Σ . Let C_Σ be the capacitance of Σ relative to a point at ∞ , and let $C_{\Sigma'}$ be the capacitance of Σ' relative to ∞ .



- (a) Is C_Σ larger or smaller than $C_{\Sigma'}$? After you pick your answer, provide a proof of this statement.
- (b) Using the theorem above, rigorously find upper and lower bounds for the capacitance of a perfectly conducting cube of metal of side length a , such that the upper and lower bounds differ from each other by no more than a factor of 2.