Exercise Sheet 11

Due at the beginning of the exercise session at 16:20. A total of at least 50% of all available points is required for the "Studienleistung" (I expect there to be 12 or 13 sheets).

These sheet is using notation from Section 3.3 in the course notes.

Exercise 1 (1 point)**.** Prove that if X is infinite, then $\mathcal{F}_{\text{fin}}^X$ does not have a $1 \to 0$ monotone compression scheme.

Exercise 2 (2 points)**.** Consider the context of the proof of Theorem 3.2.18 from the notes, in the part of the proof where we assume that $|X| \leq \aleph_k$ and conclude that $\mathcal{F}_{\text{fin}}^X$ has a $(k+2) \to (k+1)$ monotone compression scheme. Given σ as defined in the proof, show that there is a function η such that σ and η together constitute a $(k+2) \to (k+1)$ monotone compression scheme.

Exercise 3 (2 points)**.** Prove that the η^* and σ^* from the proof of Lemma 3.2.19 give a $k \to (k-1)$ monotone compression scheme.