Exercise 1.8.14

Introduction to Discrete Mathematics
MATH 2001

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ABSTRACT. This is Exercise 1.8.14 from Hammack [Ham13, §1.8]:

Exercise 1.8.14. If $J \neq \emptyset$ and $J \subseteq I$, does it follow that $\bigcap_{\alpha \in I} A_\alpha \subseteq \bigcap_{\alpha \in J} A_\alpha$? Explain.

Solution. Yes, if $J \neq \emptyset$ and $J \subseteq I$, then $\bigcap_{\alpha \in I} A_\alpha \subseteq \bigcap_{\alpha \in J} A_\alpha$. Indeed,

$$\begin{aligned} x \in \bigcap_{\alpha \in I} A_\alpha &\iff x \in A_\alpha \text{ for all } \alpha \in I \\ &\implies x \in A_\alpha \text{ for all } \alpha \in J \qquad (\text{since } J \subseteq I) \\ &\iff x \in \bigcap_{\alpha \in J} A_\alpha \end{aligned}$$

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Date: January 25, 2022.

REFERENCES

[Ham13] Richard Hammack, *Book of proof*, Creative Commons, 2013.

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