1 | **Problem 1**

The question asks us to figure scalars α and β making:

$$\alpha[\beta[A,B],C] \tag{1}$$

hermitian if A, B, and C is hermitian.

We first expand the expressions in the combinator:

$$\begin{aligned}
&\alpha[\beta[A,B],C] && (2)\\
\Rightarrow\ &\alpha[\beta(AB-BA),C] && (3)\\
\Rightarrow\ &\alpha[\beta(AB-BA),C] && (4)\\
\Rightarrow\ &\alpha\beta[(AB-BA),C] && (5)\\
\Rightarrow\ &\alpha\beta((AB-BA)C-C(AB-BA)) && (6)\\
\Rightarrow\ &\alpha\beta((ABC-BAC)-(CAB-CBA)) && (7)\\
\Rightarrow\ &\alpha\beta(ABC-BAC-CAB+CBA) && (8)
\end{aligned}$$