システム計画論 第 2 回 課題

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$$\chi_{(\tilde{A})_h}(x) = \begin{cases} 1 & \text{if} \quad x \in (\tilde{A})_h, \\ 0 & \text{otherwise.} \end{cases} \tag{1}$$

$$\sup_{h\in[0,1]} \min\left(h, \chi_{(\tilde{A})_h}(x)\right) \tag{2}$$

$$= \max\left(\sup_{h\in\left[0,\mu_{\tilde{A}}(x)\right)} \min\left(h, \chi_{\left(\tilde{A}_h\right)}(x)\right), \quad \sup_{h\in\left[\mu_{\tilde{A}}(x),1\right]} \min\left(h, \chi_{\left(\tilde{A}_h\right)}(x)\right)\right) \tag{3}$$

$$= \max\left(\sup_{h\in\left[0,\mu_{\tilde{A}}(x)\right)} \min\left(h,1\right), \quad \sup_{h\in\left[\mu_{\tilde{A}}(x),1\right]} \min\left(h, \chi_{\left(\tilde{A}_h\right)}(x)\right)\right) \quad \left(\because x \in (\tilde{A})_h,\ \forall h \in [0, \mu_{\tilde{A}}(x))\right) \tag{4}$$

$$= \max\left(\sup_{h\in\left[0,\mu_{\tilde{A}}(x)\right)} \min\left(h,1\right), \quad \sup_{h\in\left[\mu_{\tilde{A}}(x),1\right]} \min\left(h,0\right)\right) \quad \left(\because x \notin (\tilde{A})_h,\ \forall h \in [\mu_{\tilde{A}}(x), 1]\right) \tag{5}$$

$$= \max\left(\sup_{h\in\left[0,\mu_{\tilde{A}}(x)\right)} h, \quad 0\right) \tag{6}$$

$$= \max\left(\mu_{\tilde{A}}(x), \quad 0\right) \tag{7}$$

$$= \mu_{\tilde{A}}(x) \tag{8}$$