

0.1 76. Hausaufgabe

0.1.1 Geometrie-Buch Seite 117, Aufgabe 1

Im Dreieck ABC ist $\overrightarrow{AD} = \frac{2}{3}\overrightarrow{AC}$ und $\overrightarrow{BE} = \frac{3}{5}\overrightarrow{BC}$.

In welchen Verhältnissen teilen sich $[AE]$ und $[BD]$?

$$\overrightarrow{AS} = \alpha\overrightarrow{SE}; \quad \overrightarrow{BS} = \beta\overrightarrow{SD};$$

$$\overrightarrow{AS} + \overrightarrow{SB} + \overrightarrow{BA} = \underbrace{\lambda\overrightarrow{AE}}_{\overrightarrow{AS}} + \underbrace{\mu\overrightarrow{DB}}_{\overrightarrow{SB}} + \underbrace{\overrightarrow{BC} + \overrightarrow{CA}}_{\overrightarrow{BA}} = \lambda \underbrace{\left(\overrightarrow{AC} + \frac{2}{5}\overrightarrow{CB}\right)}_{\overrightarrow{AS}} + \mu \underbrace{\left(\frac{1}{3}\overrightarrow{AC} + \overrightarrow{CB}\right)}_{\overrightarrow{SB}} + \overrightarrow{BC} +$$

$$\overrightarrow{CA} = \overrightarrow{AC} \left(\lambda + \frac{1}{3}\mu - 1\right) + \overrightarrow{BC} \left(-\frac{2}{5} - \mu + 1\right) = \vec{0};$$

$$\lambda + \frac{1}{3}\mu - 1 = -\frac{2}{5} - \mu + 1 = 0; \Leftrightarrow (\lambda, \mu) = \left(\frac{4}{5}, \frac{3}{5}\right);$$

$$\overrightarrow{AS} = \alpha\overrightarrow{SE} = \lambda\overrightarrow{AE} = \lambda(\overrightarrow{AS} + \overrightarrow{SE}); \Leftrightarrow \alpha = \lambda\frac{\overrightarrow{AS}}{\overrightarrow{SE}} + \lambda = \lambda\alpha + \lambda; \Leftrightarrow$$

$$\alpha = \frac{\lambda}{1-\lambda} = 4;$$

$$\overrightarrow{BS} = \beta\overrightarrow{SD} = -\mu\overrightarrow{DB} = -\mu(\overrightarrow{DS} + \overrightarrow{SB}) = \mu\overrightarrow{SD} + \mu\overrightarrow{BS}; \Leftrightarrow \beta = \mu\frac{\overrightarrow{SD}}{\overrightarrow{SB}} +$$

$$\mu\frac{\overrightarrow{BS}}{\overrightarrow{SD}} = \mu + \mu\beta; \Leftrightarrow \beta = \frac{\mu}{1-\mu} = \frac{3}{2};$$

[XXX falsch.]