Swimming

1. $$\mathrm{ds} = \sum_{i=1}^{n} (v_i + v \cdot \sin a_i) \cdot t_i = \sum_{i=1}^{n} (v_i + v \cdot \sin a_i) \cdot \frac{s_i}{v \cdot \cos a_i}$$
$$= \sum_{i=1}^{n} (s_i \cdot \tan a_i + \frac{v_i s_i}{v \cdot \cos a_i})$$
2. $$\sum_{i=1}^{n} t_i = \sum_{i=1}^{n} \frac{s_i}{v \cdot \cos a_i} = T$$
3. $$a_i \in [0, \frac{\pi}{2})$$

目标：$\{a_i\} = \arg\max_{\vec{a}} ds(a_i), i = 1, \dots, n$

$$\mathrm{L} = \mathrm{ds} + \lambda \left(\sum_{i=1}^{n} \frac{s_i}{v \cdot \cos a_i} - T \right)$$

极值点：

- $\nabla_a L = 0$
  对于a_i
  $$\mathrm{s_i} \cdot \sec^2 a_i \cdot \left(1 + \frac{v_i}{v} \sin a_i\right) + \frac{\lambda s_i}{v} \sec^2 a_i = 0$$
  $$1 + \frac{\mathrm{v_i}}{v} \sin a_i - \frac{\lambda}{v} = 0$$
  $$a_i = \arcsin\left(\frac{\lambda - v}{v_i}\right)$$
- 代入(2)式计算λ，从而得到a_i