

# Orthographic Projection 正交投影

简单理解: 拉伸去Z轴

公式定义: ↓

$$M_{ortho} = \begin{pmatrix} \frac{2}{r-l} & 0 & 0 & 0 \\ 0 & \frac{2}{t-b} & 0 & 0 \\ 0 & 0 & \frac{2}{n-f} & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 & -\frac{r+l}{2} \\ 0 & 1 & 0 & -\frac{t+b}{2} \\ 0 & 0 & 1 & -\frac{n+f}{2} \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

(后拉伸到 (-1,1) 立方体)      (先平移视锥体)

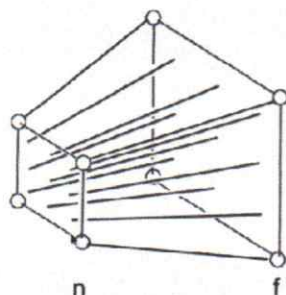
# Perspective Projection 透视投影

GAI

## Perspective Projection

- How to do perspective projection
  - First "squish" the frustum into a cuboid ( $n \rightarrow n, f \rightarrow f$ ) ( $M_{persp} \rightarrow ortho$ )
  - Do orthographic projection ( $M_{ortho}$ , already known!)

Frustum



Cuboid

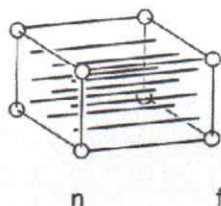


Fig. 7.13 from Fundamentals of Computer Graphics, 4th Edition



Cuboid = 长方体, 用于正交投影

Frustum = 视锥体, 用于透视投影

透视投影思路:

把 Frustum 转换成 Cuboid。

(压扁视锥体)