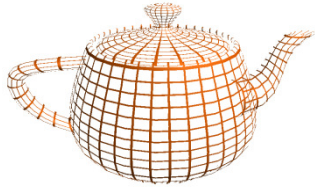


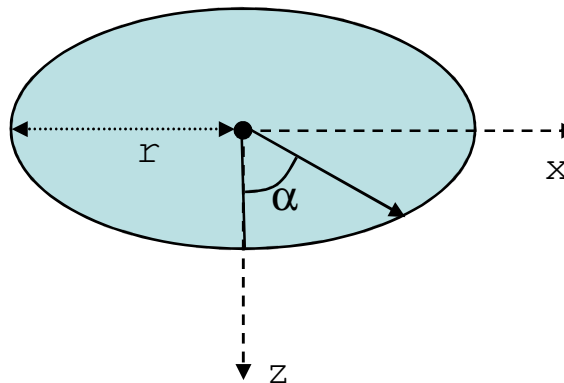


## Movimentos de Câmera - Modo Explorador

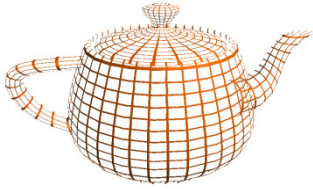


# Coordenadas Polares

- Coordenadas que permitem especificar um ponto num círculo.
- $(\alpha, r)$



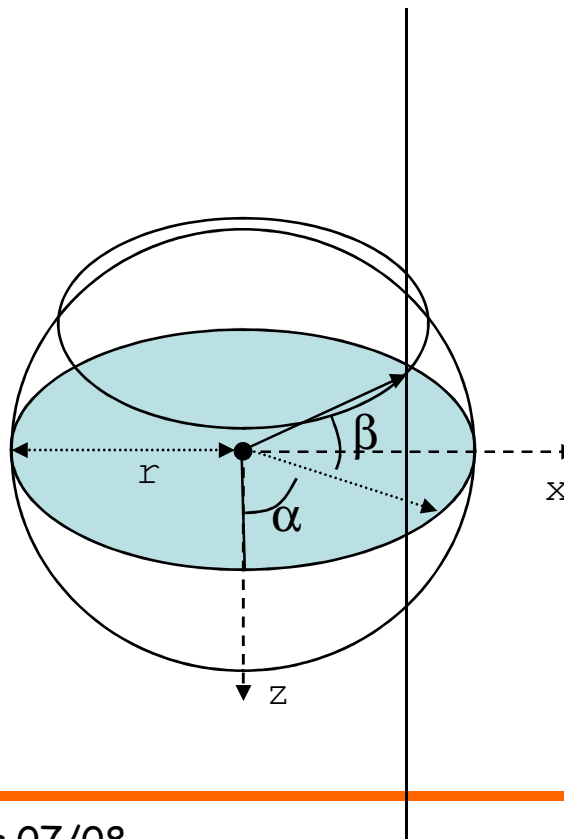
$$\begin{aligned}z &= r * \cos(a); \\x &= r * \sin(a); \end{aligned}$$



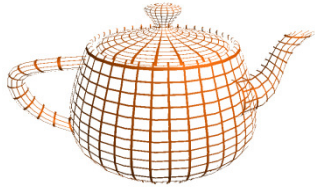
# Coordenadas Esféricas

- Permitem especificar um ponto numa esfera

- $(\alpha, \beta, r)$



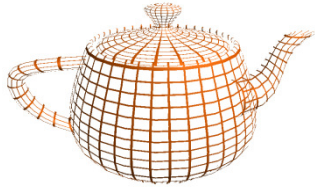
$$\begin{aligned}z &= r * \cos(\beta) * \cos(\alpha); \\x &= r * \cos(\beta) * \sin(\alpha); \\y &= r * \sin(\beta); \end{aligned}$$



# Algumas Funções Necessárias

---

- `glutMotionFunc(fmotion);`
  - `void fmotion(int x, int y);`
- `glutMouseFunc(fmouse);`
  - `void fmouse(int button, int mode, int x, int y);`
- `glutKeyboardFunc(processNormalKeys);`
  - `void processNormalKeys(unsigned char key, int x, int y)`



# Exercício

---

- Completar o esqueleto fornecido de modo a criar uma aplicação interactiva que permita movimentar a câmara em torno do objecto utilizando o teclado.
- Implementar a mesma funcionalidade utilizando o rato.