

CUBEMAPS

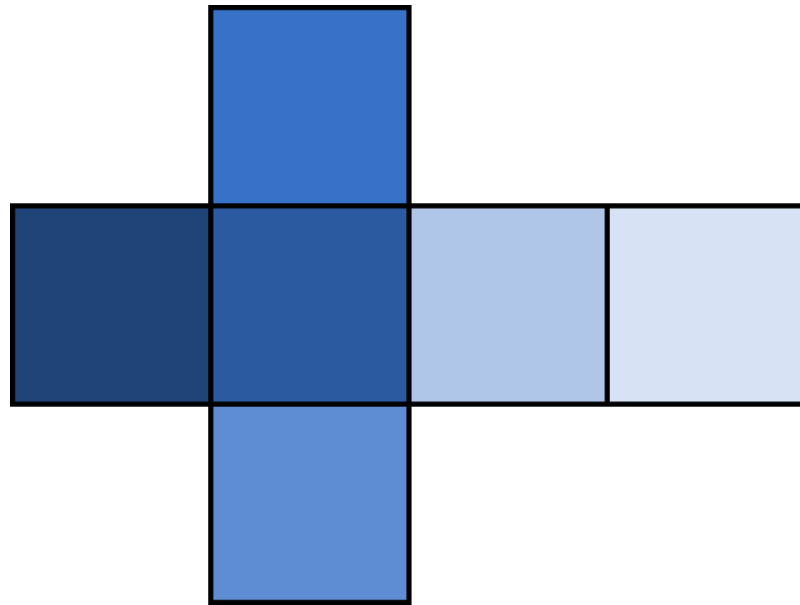
23.11.2020

Senta Mandutz

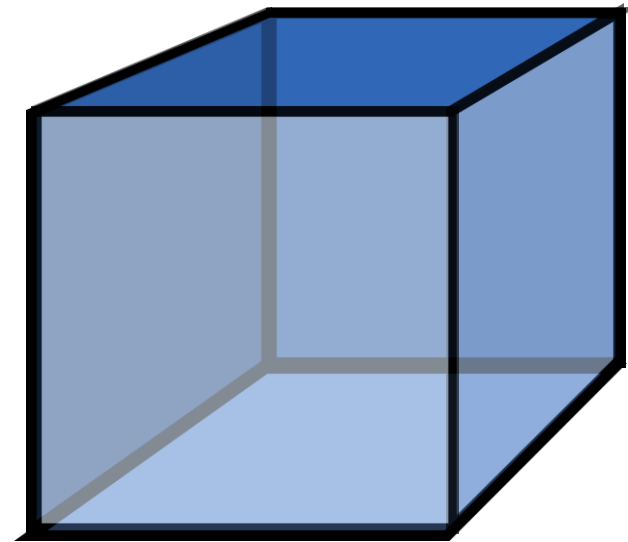
WiSe 20/21

GLIEDERUNG

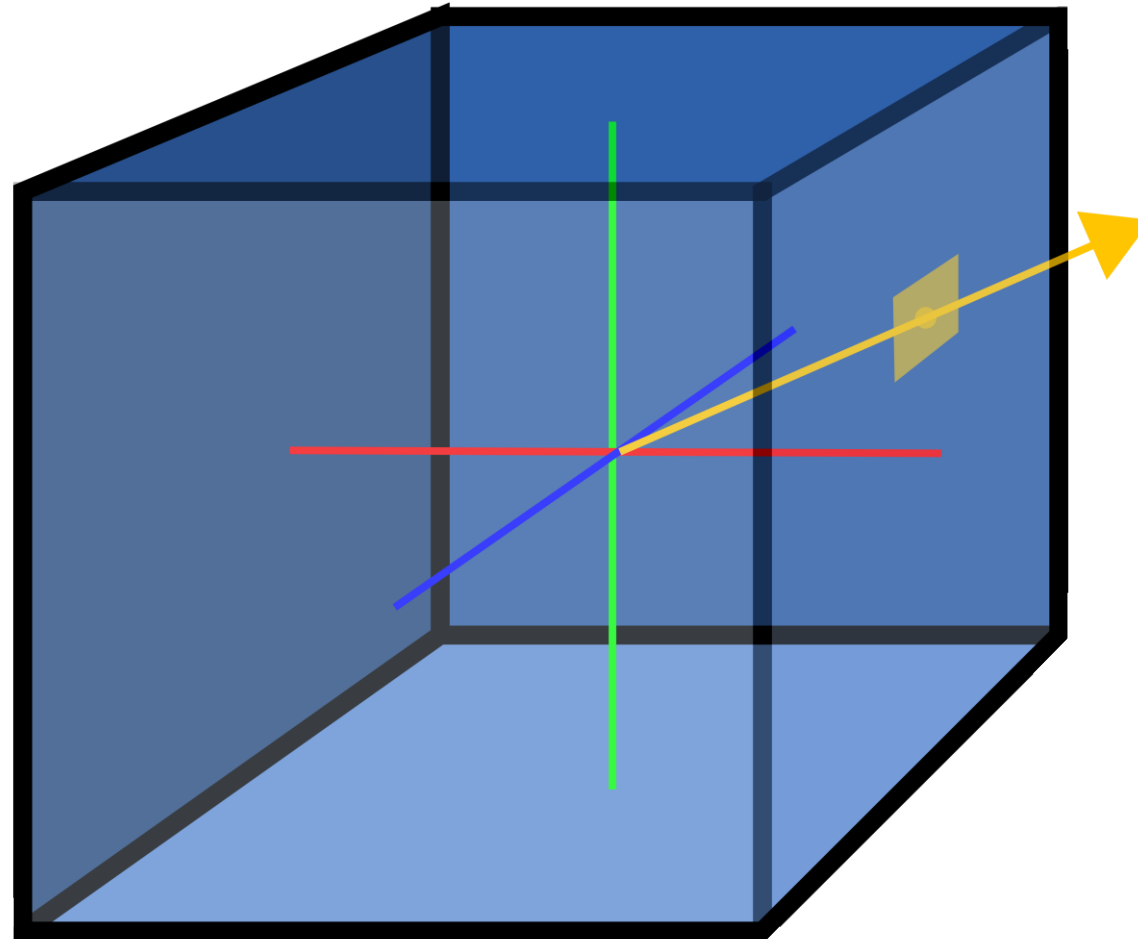
- Cubemaps
- Anwendungsfälle
 - Skybox
 - Reflection
 - Refraction



Grafik 1: eigene Darstellung



Grafik 2: eigene Darstellung



Grafik 3: eigene Darstellung nach (1)

Major axis direction	Target	sc	tc	ma
+x	GL_TEXTURE_CUBE_MAP_POSITIVE_X	-z	-y	x
-x	GL_TEXTURE_CUBE_MAP_NEGATIVE_X	+z	-y	x
+y	GL_TEXTURE_CUBE_MAP_POSITIVE_Y	+x	+z	y
-y	GL_TEXTURE_CUBE_MAP_NEGATIVE_Y	+x	-z	y
+z	GL_TEXTURE_CUBE_MAP_POSITIVE_Z	+x	-y	z
-z	GL_TEXTURE_CUBE_MAP_NEGATIVE_Z	-x	-y	z

Tabelle 1: eigene Darstellung nach (7)

$$s = \frac{\frac{sc}{|ma|} + 1}{2}$$

$$t = \frac{\frac{tc}{|ma|} + 1}{2}$$

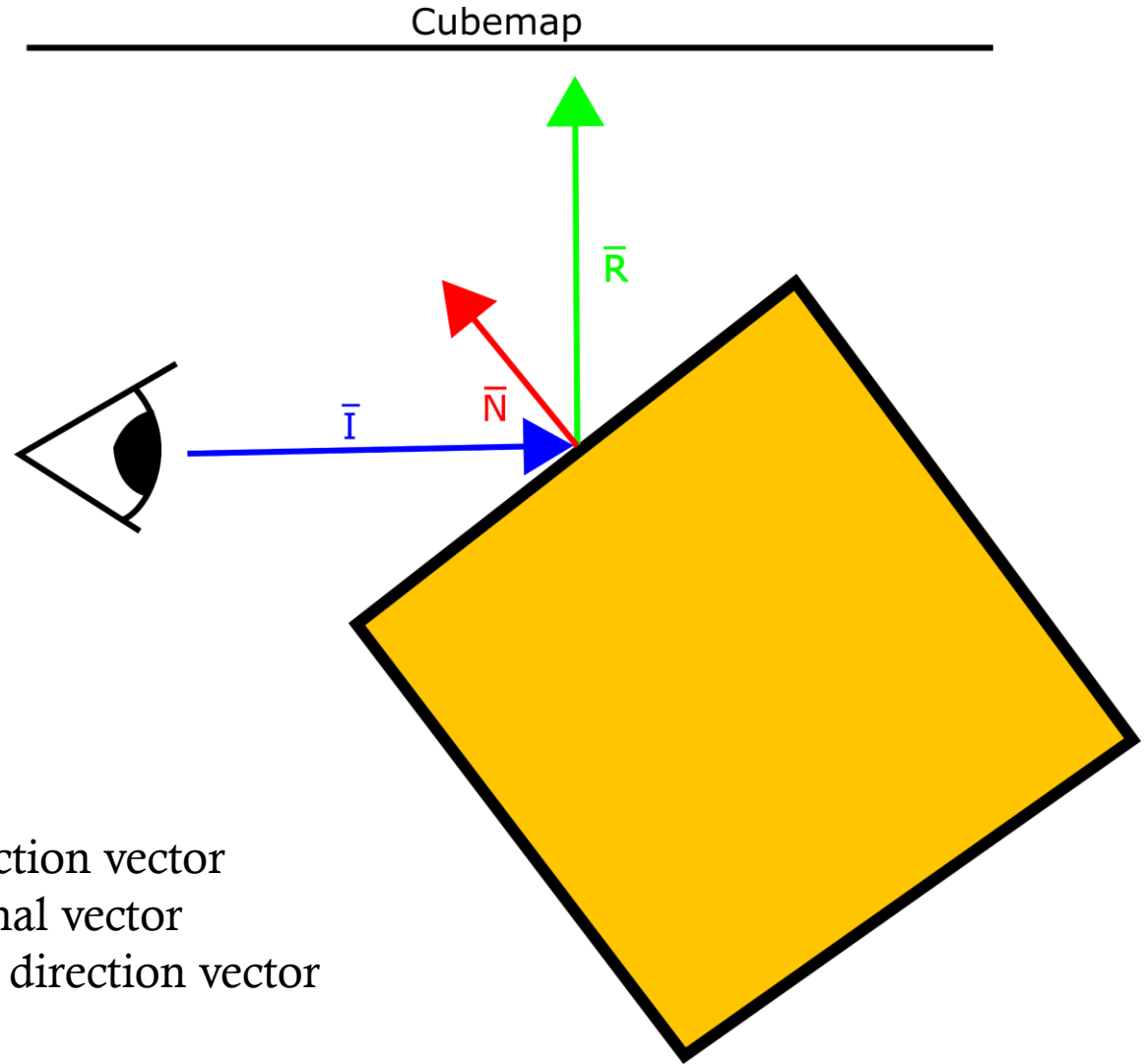


Grafik 4: Beispiel Skybox bei Joey de Vries (1)

REFLECTION

$$R = I - 2.0 * \text{dot}(N, I) * N$$

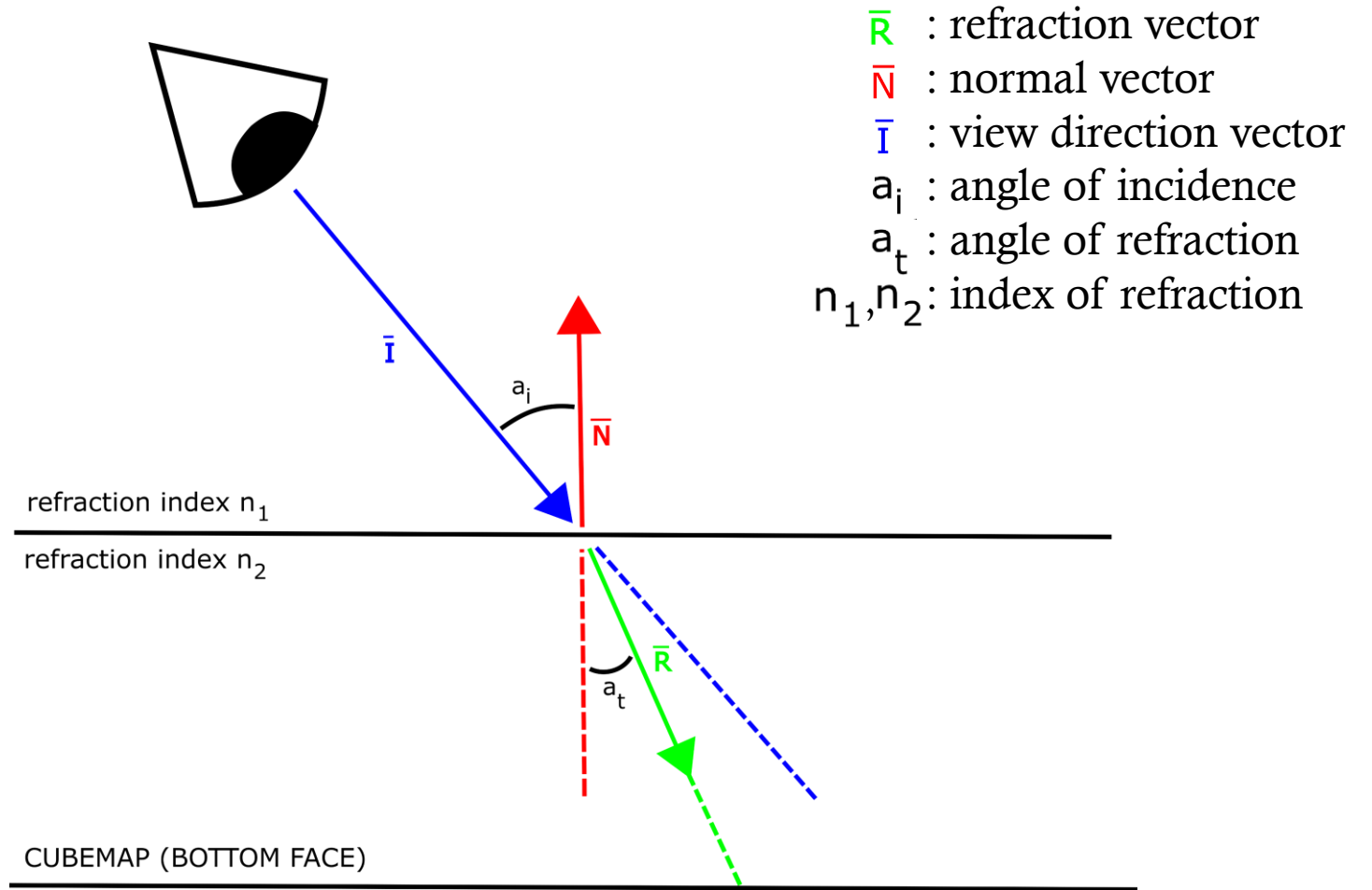
\bar{R} : reflection vector
 \bar{N} : normal vector
 \bar{I} : view direction vector



REFRACTION

Shell's Law:

$$\frac{\sin a_i}{\sin a_t} = \frac{n_2}{n_1}$$



Shell's Law:

$$\frac{\sin a_i}{\sin a_t} = \frac{n_2}{n_1}$$

Material	Refraction index
Air	1.00
Water	1.33
Ice	1.309
Glass	1.52
Diamond	2.42

Tabelle 2: eigene Darstellung nach (1)



FRAGEN?

QUELLEN

- (1) Joey de Vries, 2020, Learn OpenGL Graphics Programming, <https://learnopengl.com>
- (2) David Wolff, 2018, OpenGL 4 Shading Language Cookbook, Packt Publishing
- (3) Khronos Group, 2014, reflect, <https://www.khronos.org/registry/OpenGL-Refpages/gl4/html/reflect.xhtml>
- (4) DGL Wiki, 2012, Tutorial Cubemap, https://wiki.delphigl.com/index.php/Tutorial_Cubemap
- (5) Anton Gerdelan, 2016, Cube Maps: Sky Boxes and Environment Mapping, <https://antongerdelan.net/opengl/cubemaps.html>
- (6) Khronos Group, 2020, Cubemap Textures, https://www.khronos.org/opengl/wiki/Cubemap_Texture
- (7) NVIDIA Corporation, 1999, OpenGL Cube Map Texturing, https://cgvr.cs.uni-bremen.de/teaching/cg_literatur/Cube_map_tutorial/cube_map.html