import streamlit as st

import numpy as np

import matplotlib.pyplot as plt

# Data indeks bias

materials = {

"Udara": 1.00,

"Air": 1.33,

"Kaca": 1.50,

"Akrilik": 1.49,

"Minyak": 1.46

}

st.title("Simulasi Pembiasan Cahaya (Hukum Snellius)")

st.write("Aplikasi ini menghitung sudut bias serta menampilkan visualisasi pembiasan cahaya")

# Input

medium1 = st.selectbox("Medium asal (n1)", list(materials.keys()))

medium2 = st.selectbox("Medium tujuan (n2)", list(materials.keys()))

theta1\_deg = st.slider("Sudut datang (°)", 0.0, 80.0, 30.0)

n1 = materials[medium1]

n2 = materials[medium2]

theta1 = np.radians(theta1\_deg)

# Perhitungan sudut bias

try:

theta2 = np.arcsin((n1 / n2) \* np.sin(theta1))

theta2\_deg = np.degrees(theta2)

total\_internal\_reflection = False

except ValueError:

total\_internal\_reflection = True

theta2\_deg = None

st.subheader("Hasil Perhitungan")

if total\_internal\_reflection:

st.error("Terjadi \*\*Pembiasan Total Internal\*\*. Tidak ada sinar bias keluar.")

else:

st.success(f"Sudut bias: \*\*{theta2\_deg:.2f}°\*\*")

# Jenis pembiasan

if theta2\_deg < theta1\_deg:

st.info("Sinar \*\*mendekati garis normal\*\* karena masuk medium lebih rapat (n2 > n1)")

else:

st.info("Sinar \*\*menjauhi garis normal\*\* karena masuk medium lebih renggang (n2 < n1)")

# Plot visualisasi

fig, ax = plt.subplots()

ax.axvline(0, color='black', linestyle='--')

# Sinar datang

ax.plot([0, -np.sin(theta1)], [0, np.cos(theta1)], label="Sinar Datang")

# Sinar bias

ax.plot([0, np.sin(theta2)], [0, -np.cos(theta2)], label="Sinar Bias")

ax.set\_xlim(-1, 1)

ax.set\_ylim(-1, 1)

ax.set\_aspect('equal')

ax.set\_title('Visualisasi Pembiasan')

ax.legend()

ax.axis('off')

st.pyplot(fig)