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| nsu_logo_download.jpg  **North South University**  **Assignment**  **Course Code:** EEE111  **Course Title:** Analogue Electronics  **Faculty:** Dr. Hafiz Imtiaz  **Date of Submission**: 13 December, 2024  **Section**: 11  **Written By:** Md. Arebi Sarker  **ID:** 2221362042 |

**Python code:**

import matplotlib.pyplot as plt

V\_Th = 2.81

V\_BE = 0.7

R\_Th = 7.15e3

V\_T = 26e-3

R\_E = 1.5e3

R\_C = 6.8e3

beta\_values = [i for i in range(20, 121)]

Z\_i\_values = []

A\_v\_values = []

for beta in beta\_values:

    I\_B = (V\_Th - V\_BE) / (R\_Th + (1 + beta) \* R\_E)

    r\_e = V\_T / ((1 + beta) \* I\_B)

    Z\_i = (R\_Th \* beta \* r\_e) / (R\_Th + (beta \* r\_e))

    A\_v = -R\_C / r\_e

    Z\_i\_values.append(Z\_i)

    A\_v\_values.append(A\_v)

plt.figure()

plt.plot(beta\_values, Z\_i\_values, 'r--', label="Input Impedance $Z\_i$")

plt.xlabel("Beta (β)")

plt.ylabel("Input Impedance $Z\_i$ (Ω)")

plt.title("Input Impedance $Z\_i$ vs Beta")

plt.legend()

plt.grid()

plt.figure()

plt.plot(beta\_values, A\_v\_values, 'b--', label="Voltage Gain $A\_v$")

plt.xlabel("Beta (β)")

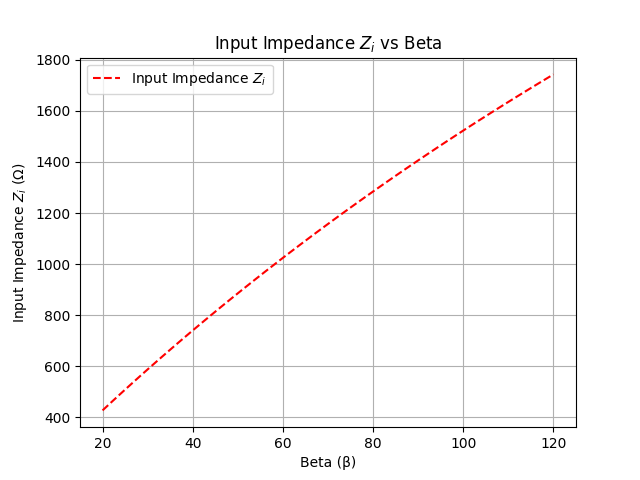
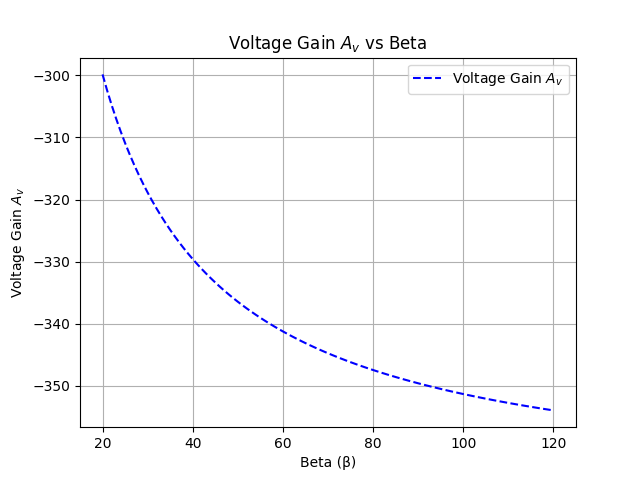
plt.ylabel("Voltage Gain $A\_v$")

plt.title("Voltage Gain $A\_v$ vs Beta")

plt.legend()

plt.grid()

plt.show()

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