Fachgebiet Leistungselektronik und Elektrische Antriebstechnik
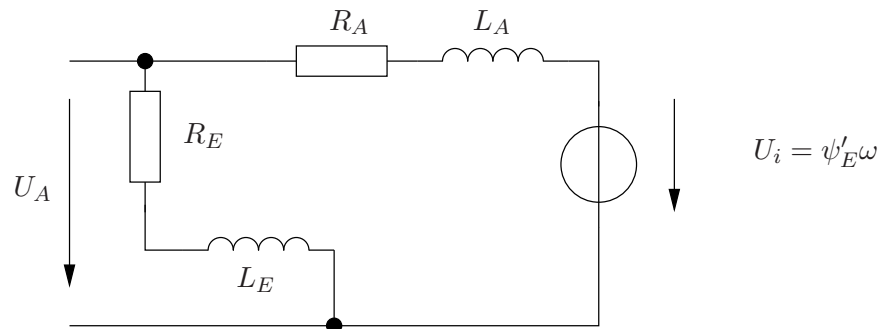Prof. Dr.-Ing. J. Böcker

LEA

Exercise 8: DC shunt motor

A DC shunt motor (see figure) is given at the rated voltage $U_N = 220\,\text{V}$. The rated power is $P_N = 11\,\text{kW}$. With no-load, motor has the current $I = 5\,\text{A}$ at speed $n = 1150\,\text{min}^{-1}$. The armature resistance is $R_A = 0.5\,\Omega$ and excitation resistance is $R_E = 110\,\Omega$.

Questions:

a)At rated operation point
Calculate the following at rated operation point:

- the speed,

- the torque,

- and the efficiency,

of the motor.

b)Starting of motor

- Calculate the starting armature current of motor.

- Where must a series resistor be inserted.

- How much is the value of series resistor, if the starting armature current must be smaller than 150% of rated current.

- At what speed can it be bridged?