ECE132: Basic Electrical and Electronics Engineering Lab

Experiment 2: To understand the principle of turn ratio of a transformer

Introduction

A transformer is a static device which transfers electrical energy from one circuit to another with no direct electrical connection between the two but they are magnetically coupled. It transforms power from one circuit to another without changing its frequency and KVA. A transformer can increase or decrease the voltage with corresponding decrease or increase in current. It helps in providing isolation of the secondary side from the primary side and hence provides safety for the person handling it on the load side.

Turn Ratio

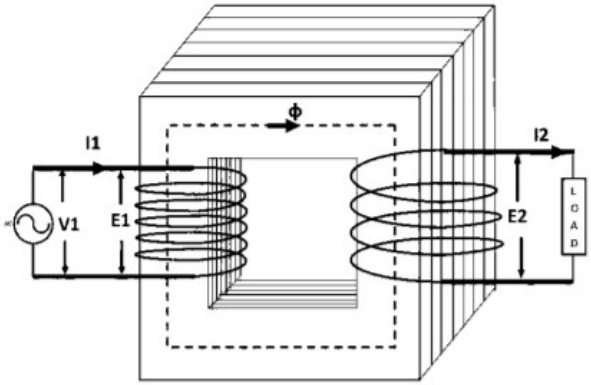
It is defined as the ratio of primary to secondary turns.

Turns Ratio = N1 / N2

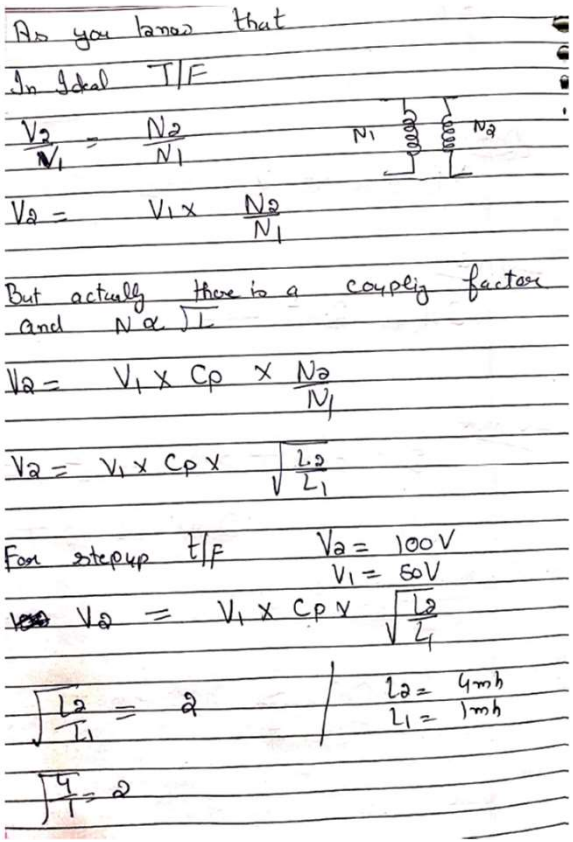
If N2> N1 the transformer is called Step up transformer

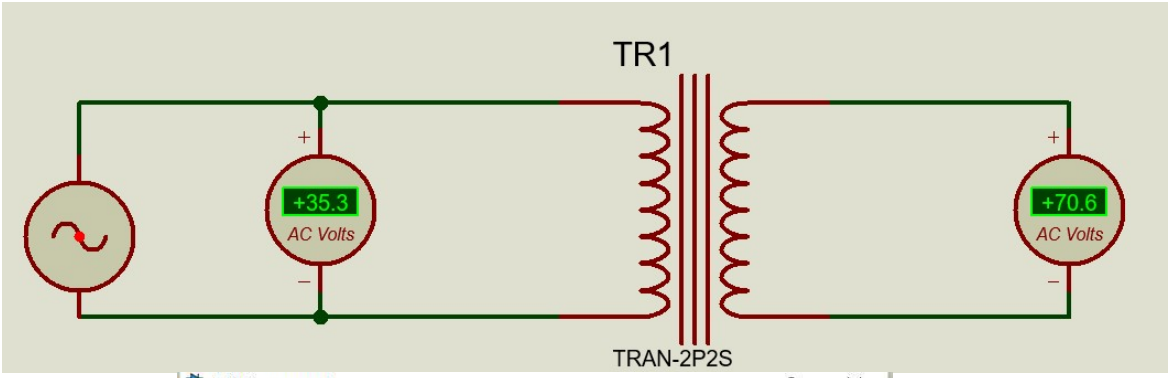
If N2< N1 the transformer is called Step down transformer

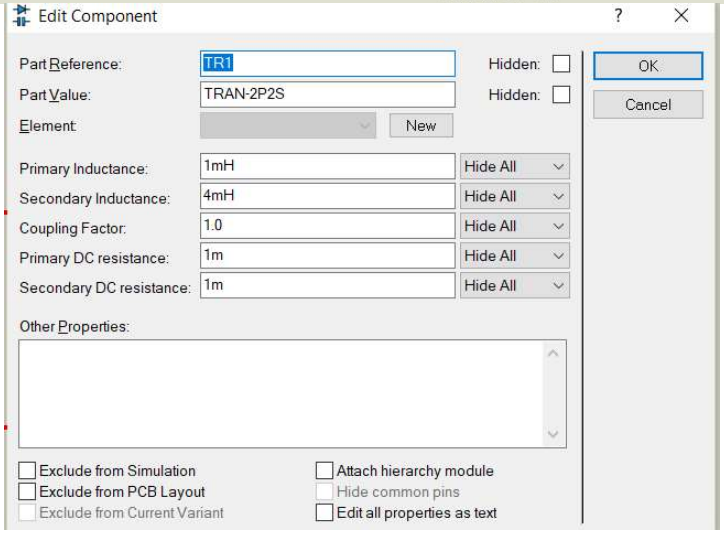
If N2 =N1 the transformer is called Isolation transformer



Transformer setting calculation







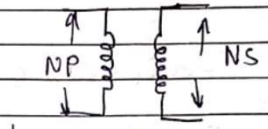
Transformer setting calculation

If T/f is with tapping and $C_p = 100\%$

at 100% tapping $N_p = N_s$

Let assume $N_p = 100$

$N_s = 100$



We have four tapping at secondy

$$N_{s1} = N_{s2} = N_{s3} = N_{s4} = \frac{100}{4} = 25$$

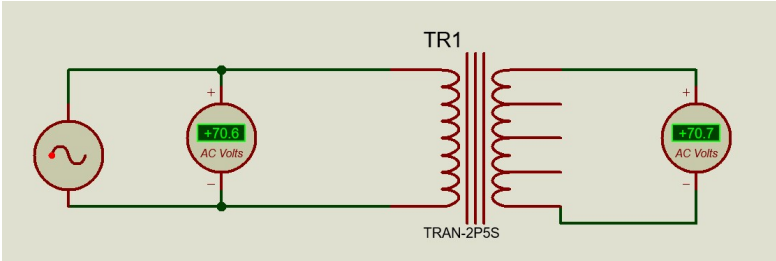
Now calculate inductance b/w each tapping

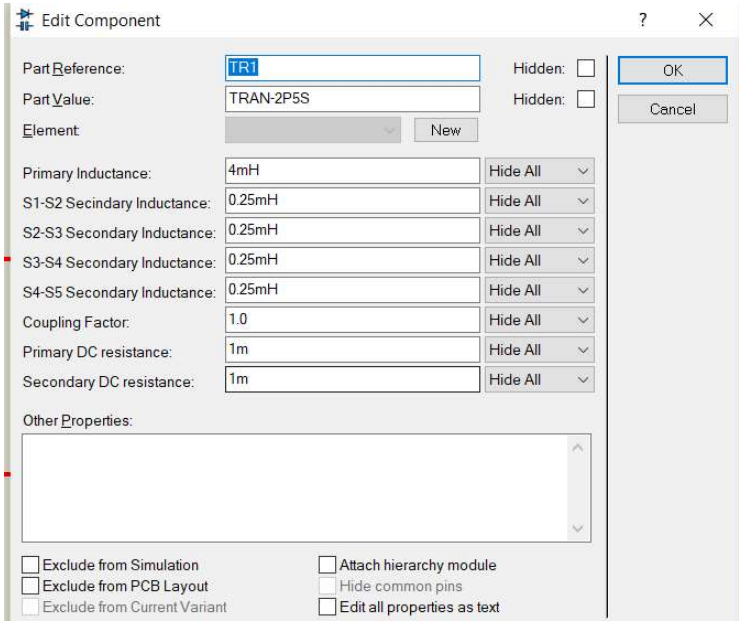
$$\frac{L_{s1} + L_{s2} + L_{s3} + L_{s4}}{L_p} = \frac{N_{s1}^2 + N_{s2}^2 + N_{s3}^2 + N_{s4}^2}{N_p^2}$$

$$= \frac{(25)^2 \times 4}{(100)^2} = \frac{1}{4}$$

If $L_p = 4mh$

then $L_{s1} = 1/4\ mh = 0.25mh$

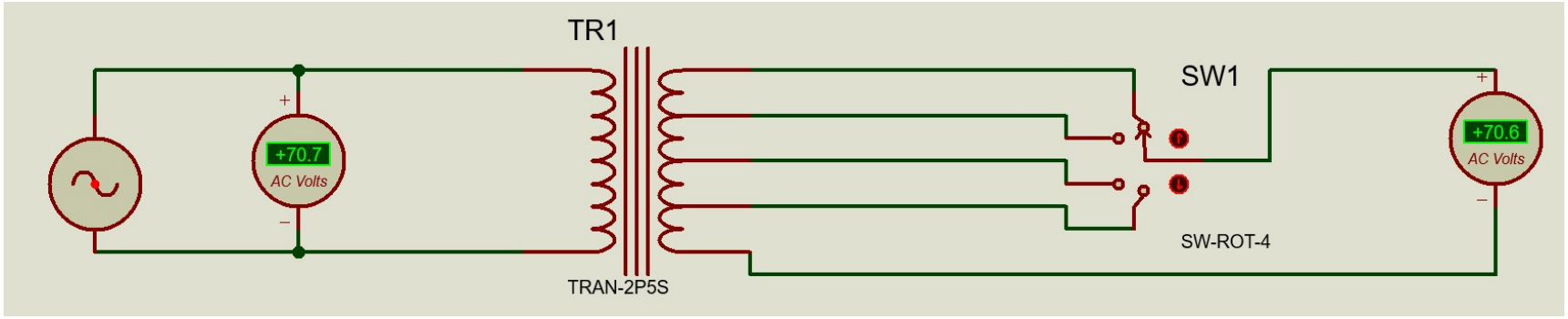




Observation and Calculation

S.No.	V1	V2	N1	N2	Turns ratio

Simulation Diagram



Thanks You