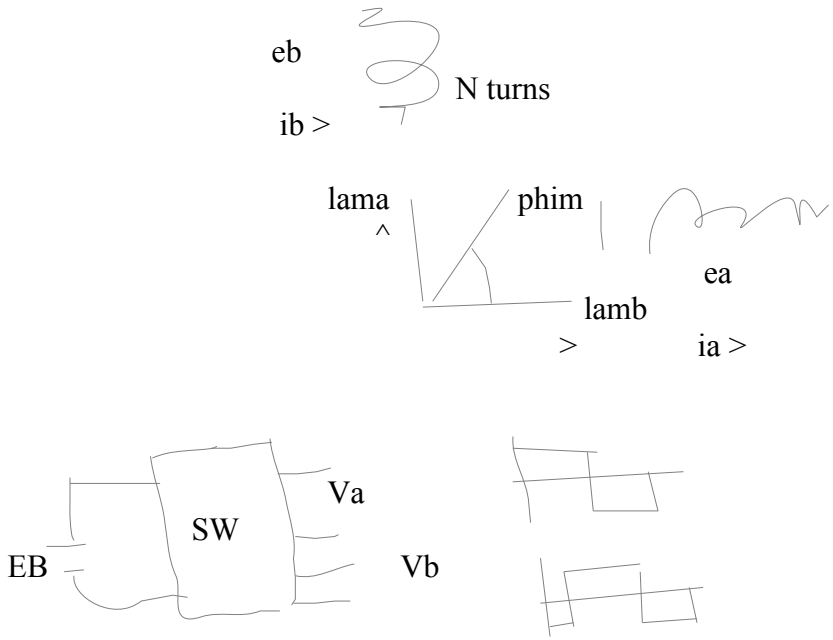
A simple stepper motor Model

Narsim Ramesh
July 2016



2 Flux linkage

lama = L*ia + Nphim cos(theta)
lamb = L*ib +Nphim sin(theta)

3 $\begin{bmatrix} ea \\ eb \end{bmatrix} = d/dt \begin{bmatrix} lama \\ lamb \end{bmatrix}$

4 Wstored =1/2 [ia ib] dot [lama lamb] ' so Tor= -d/dtheta(Wstored)

Tor = 1/2(-iaNphim*sin(theta +ibN*cos(theta)

5 Equations

[Va Vb] ' =
[Ria +Ldia/dt) - N*phim*sin(theta)d(theta)/dt ; (Rib +Ldib/dt) + N*phim*cos(theta)d(theta)/dt]

Tor = J *d^2/dtheta^2 + Tload

6 Block diagram can be drawn from above equations