

TSTE05 Elektronik & mätteknik

Föreläsning 12

Dioder

Bipolartransistorer – Inledning

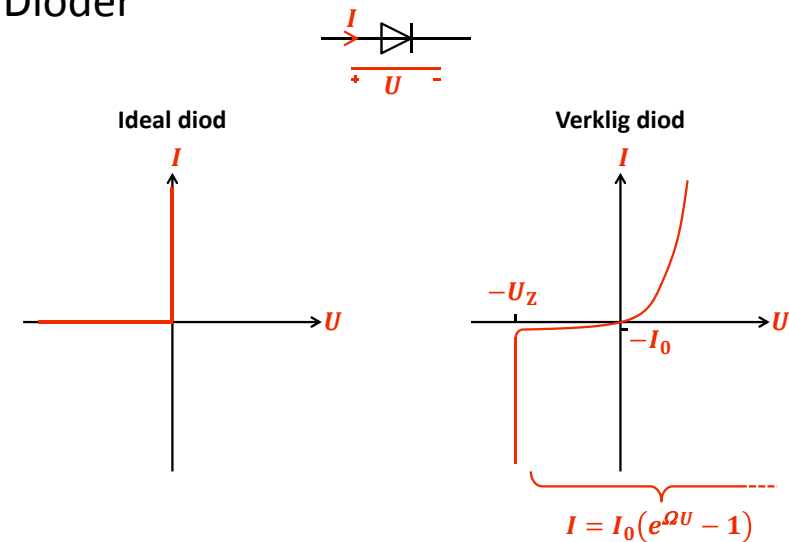
Föreläsningen börjar 15:20

Mikael Olofsson

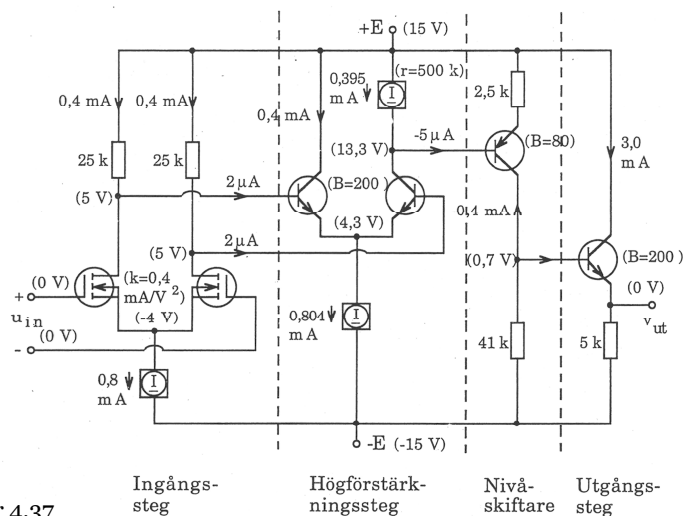
Institutionen för Systemteknik (ISY)

Ämnesområdet Elektroniska kretsar och system

Dioder

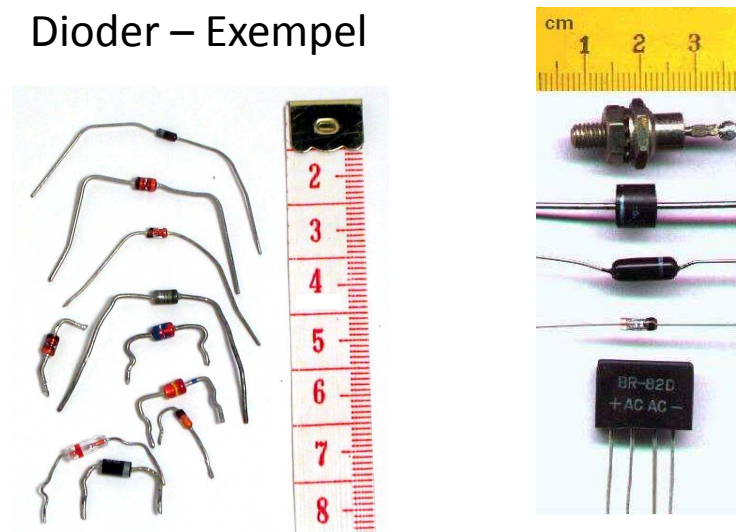


Operationsförstärkare



Figur 4.37

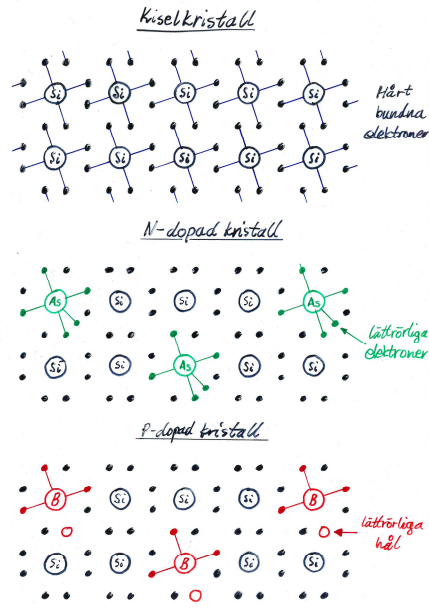
Dioder – Exempel



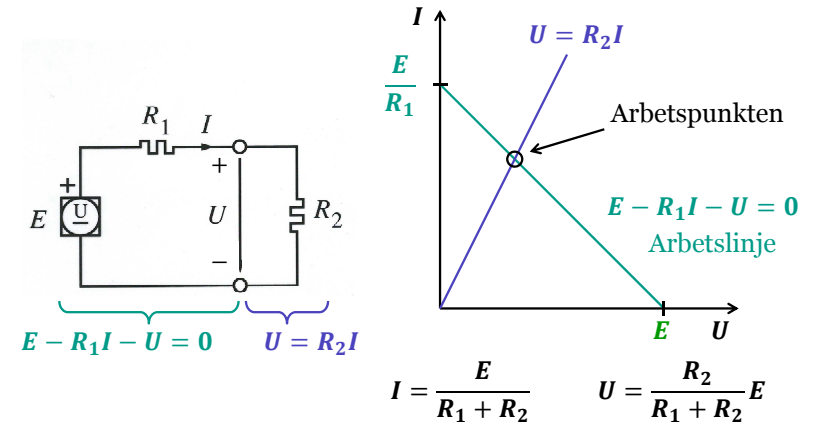
Källa: Wikipedia

Halvledare

3 A	4 A	5 A
5 B Bor 10.811	6 C Kväve 12.0111	7 N Nitrogen 14.0067
13 Al Aluminium 26.9815	14 Si Kisel 28.086	15 P Fosfor 30.9738
31 Ga Gallium 69.72	32 Ge Germanium 72.59	33 As Arsenik 74.9216
49 In Indium 114.82	50 Sn Tenn 118.69	51 Sb Antimon 121.75
81 Tl Tallium 204.37	82 Pb Bly 207.19	83 Bi Bismut 208.980

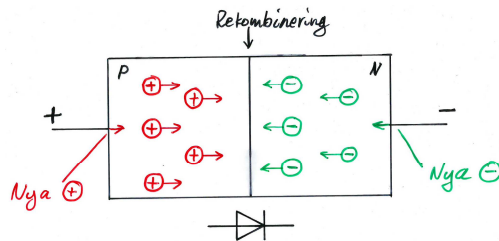


Arbetspunktsbestämning – Introduktion

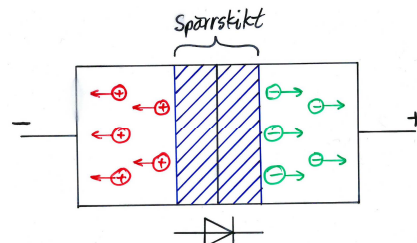


Diodens funktion

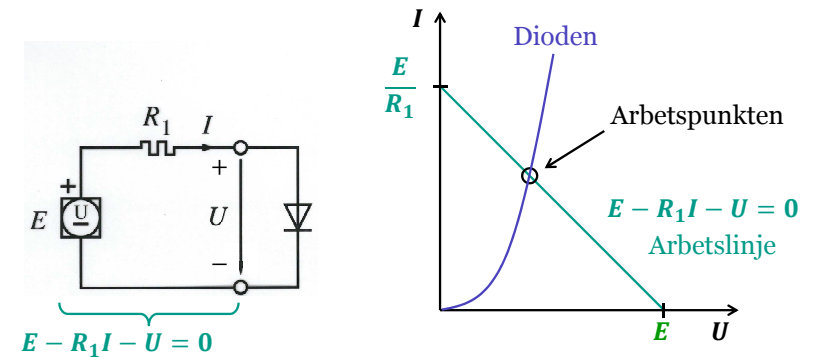
Framspänd diod:



Backspänd diod:

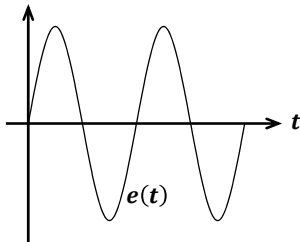
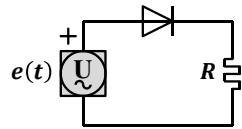


Arbetspunktsbestämning för diod

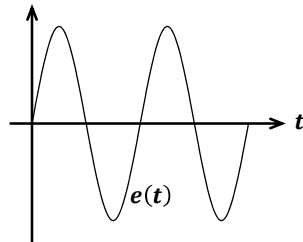
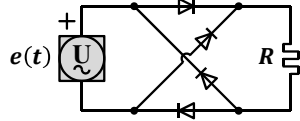


Likriktning med diod 1(3)

Halvågslikriktning

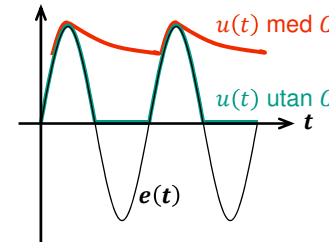
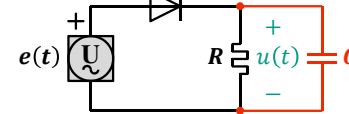


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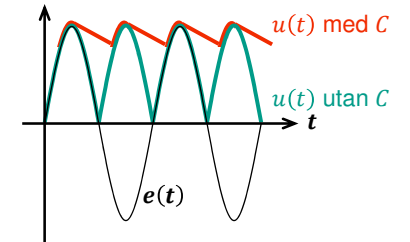
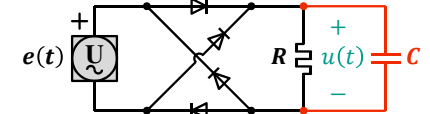


Likriktning med diod 2(3)

Halvågslikriktning

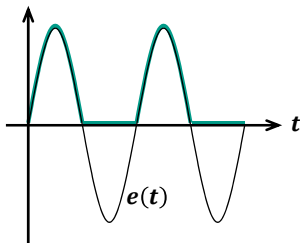
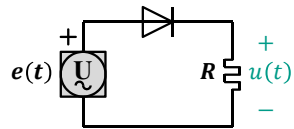


Helvågslikriktning

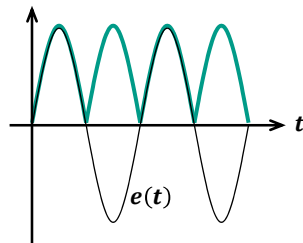
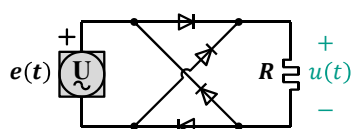


Likriktning med diod 2(3)

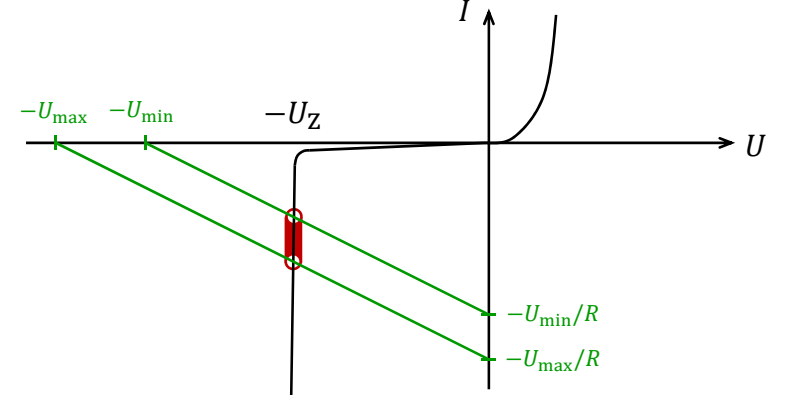
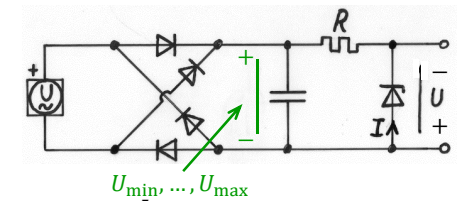
Halvågslikriktning



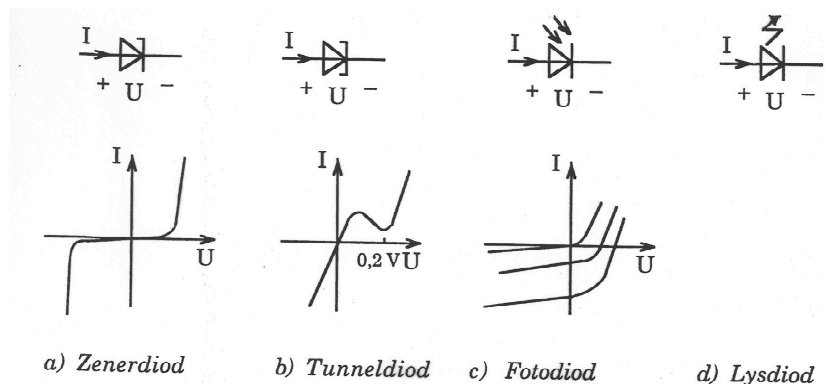
Helvågslikriktning



Stabilisering med zenerdiod



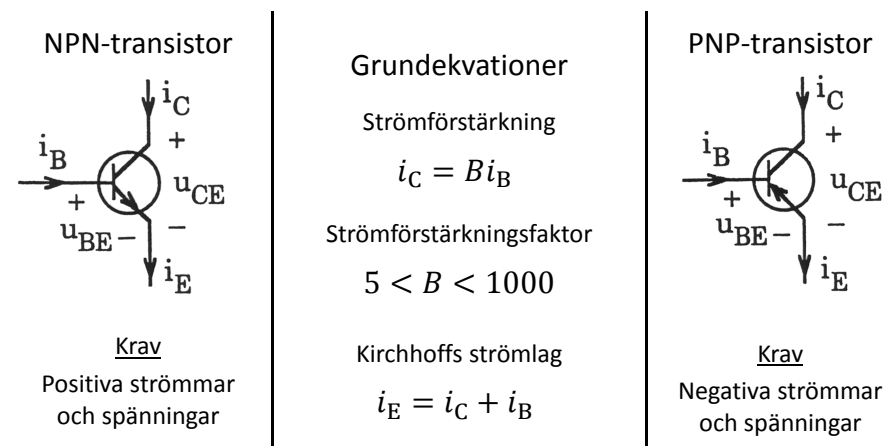
Andra slags dioder



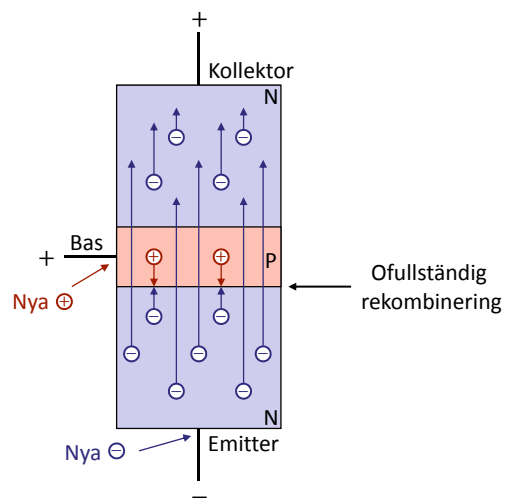
Figur 3.72 Symbol och karaktäristik för några olika diodtyper.

Figur 3.72 ur Söderkvist

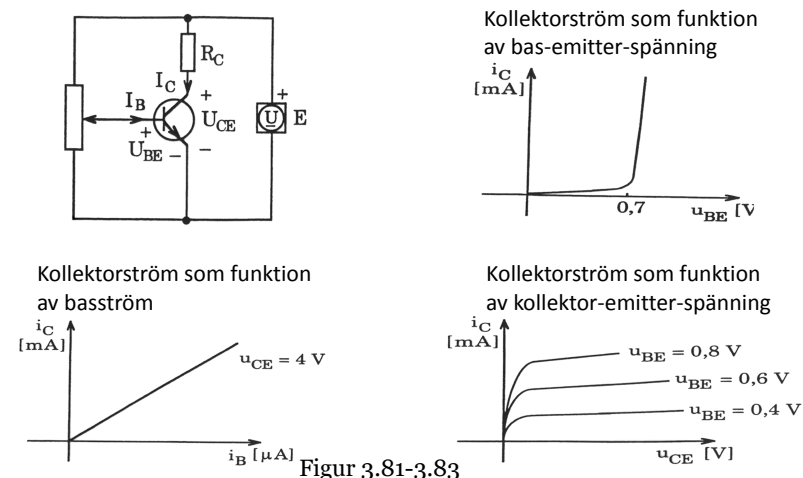
Bipolartransistorer – Variabler och referensriktningar



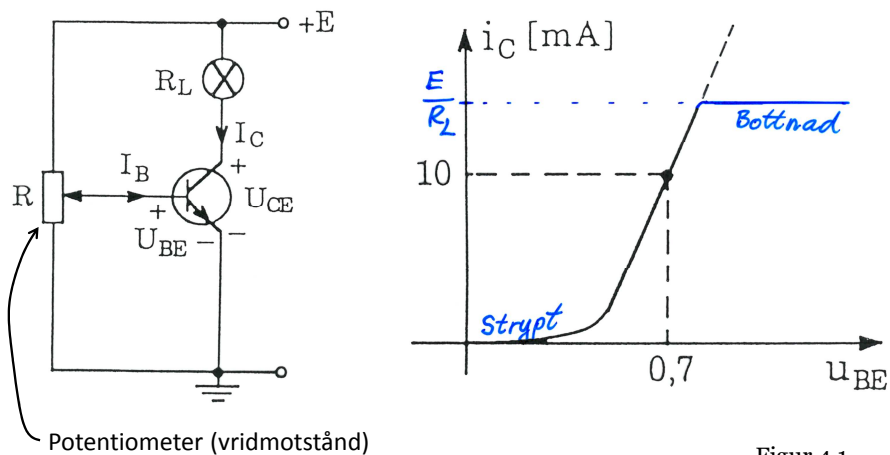
Bipolartransistorn - NPN



Bipolartransistorer – Några samband



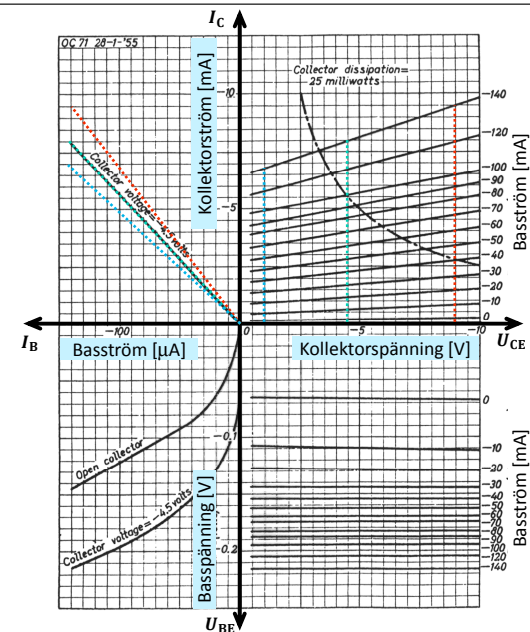
Strömstyrning med NPN-transistor



Figur 4.1

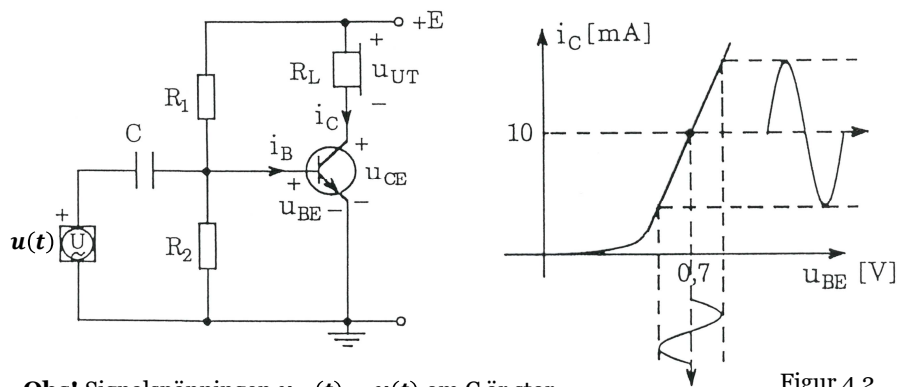
Fullständigt kurvblad för PNP-transistor

Observera: Fyra diagram i ett.
Varje kvadrant är ett separat
diagram



Figur 3.84

Förstärkning av signalspänning



Figur 4.2

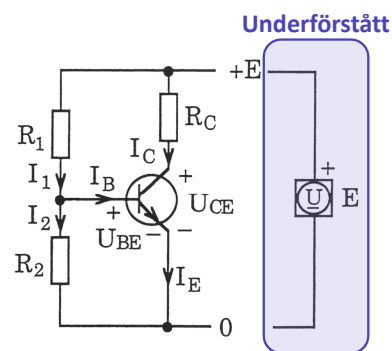
Obs! Signalspänningen $u_{be}(t) = u(t)$ om C är stor.

$$u_{BE}(t) = U_{BEQ} + u_{be}(t)$$

$$i_C(t) = I_{CQ} + i_c(t)$$

$$u_{UT}(t) = R_L i_c(t)$$

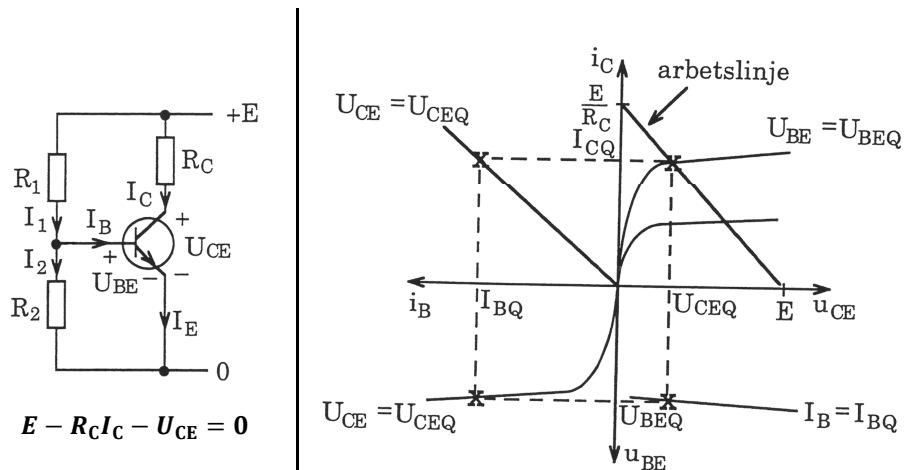
Enkel transistorkoppling – Arbetslinje



$$\text{KVL: } E - R_C I_C - U_{CE} = 0$$

Figur 3.85a,b

Enkel transistorkoppling – Arbetspunkt

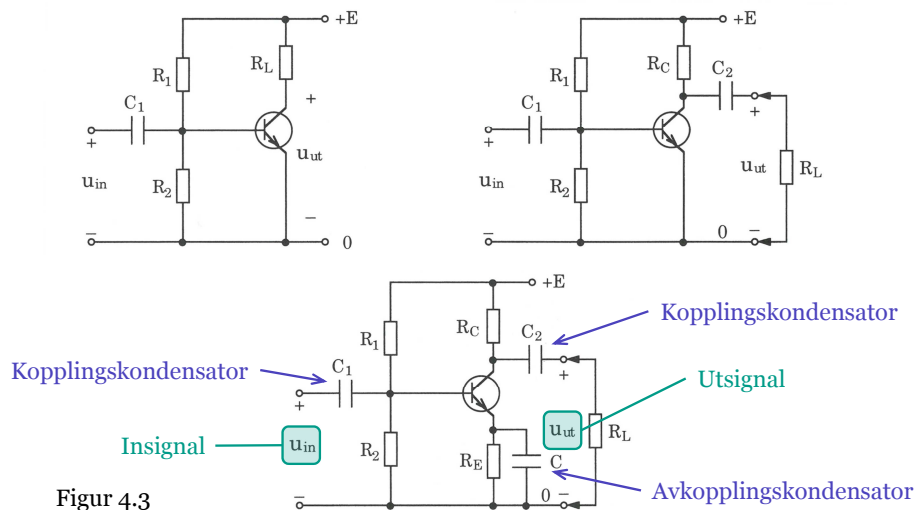


Figur 3.85a,c

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www.liu.se

GE-steg – Gemensam emitter



Figur 4.3