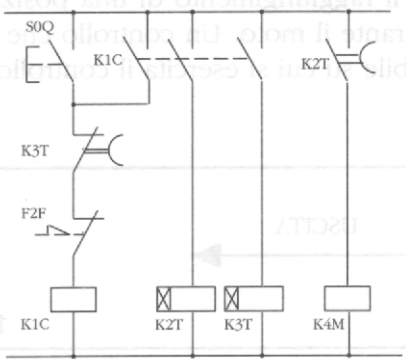
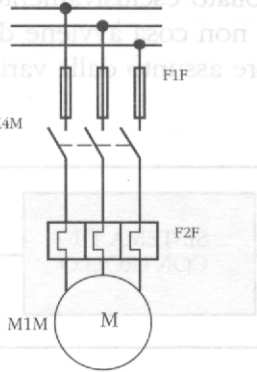
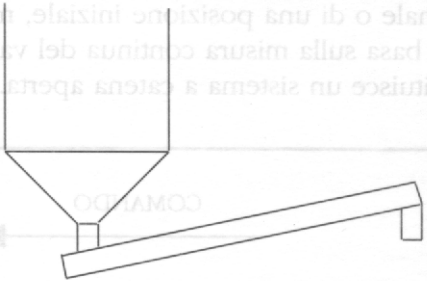
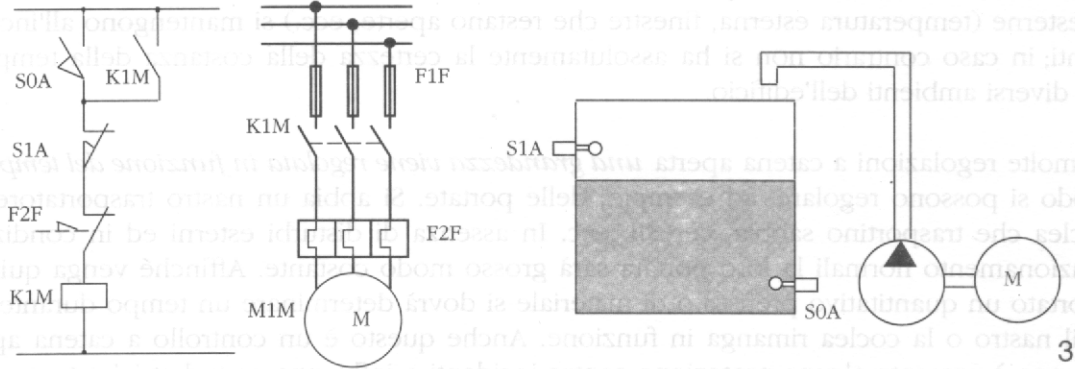
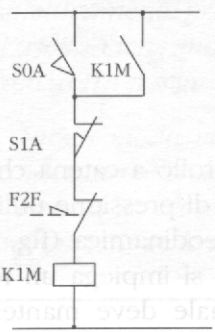
1.7

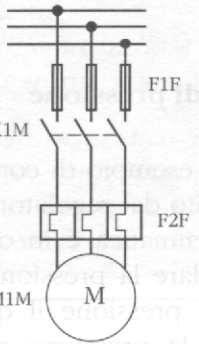

S0Q
K1C
K2T
K3T
F2F
K1C
K2T
K3T
K4M

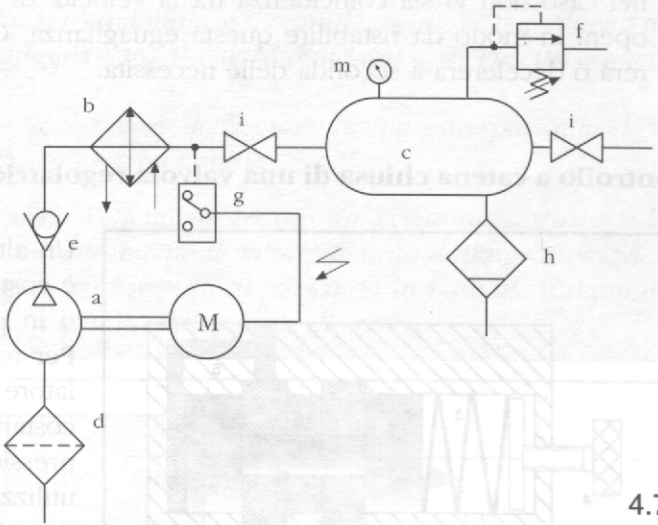

F1F
K4M
F2F
M1M
M

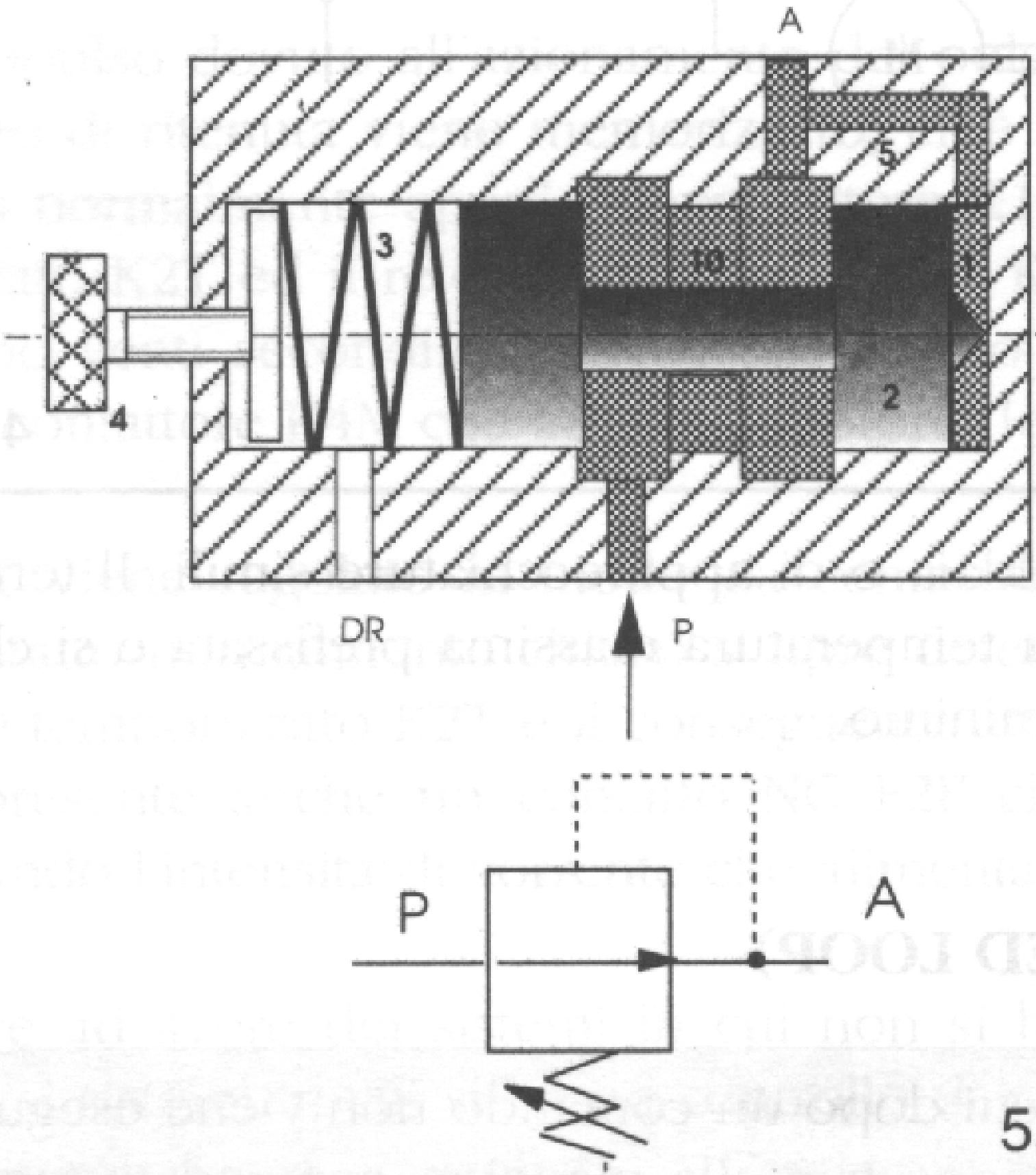



S0A
K1M
S1A
F2F
K1M
K1M
F1F
F2F
M1M
M
S1A
S0A
M

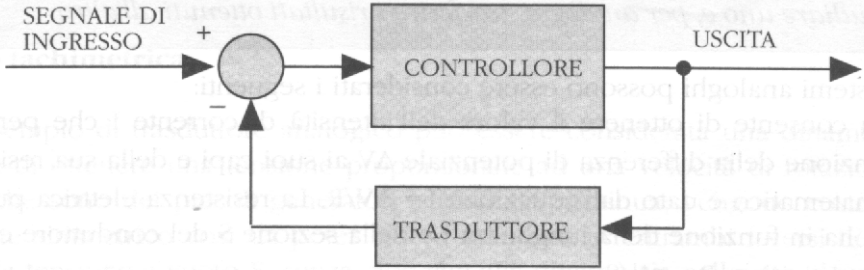

S0A
K1M
S1A
F2F
K1M


F1F
K1M
F2F
M1M
M

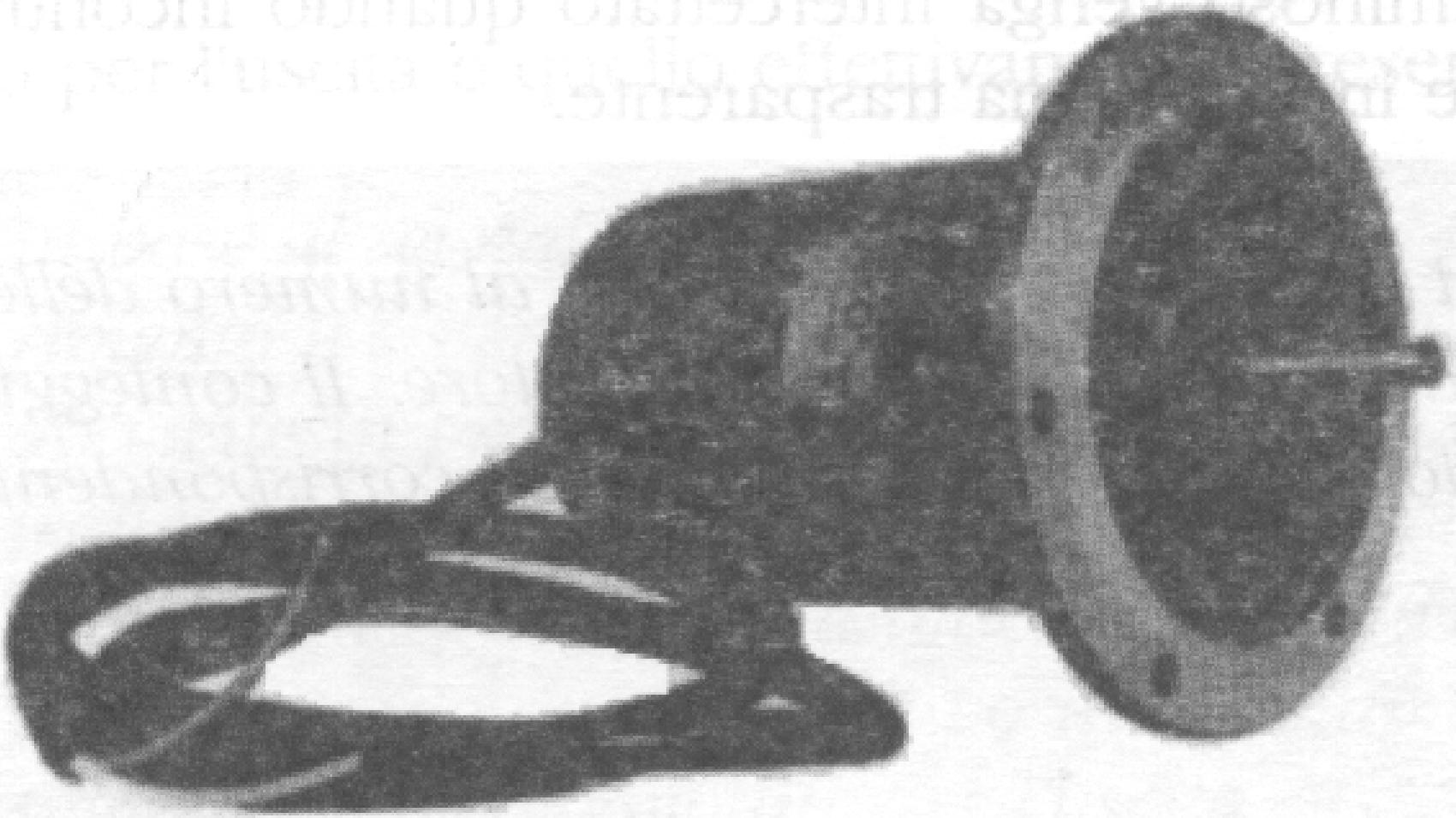

m
f
b
i
i
c
g
e
h
a
M
d



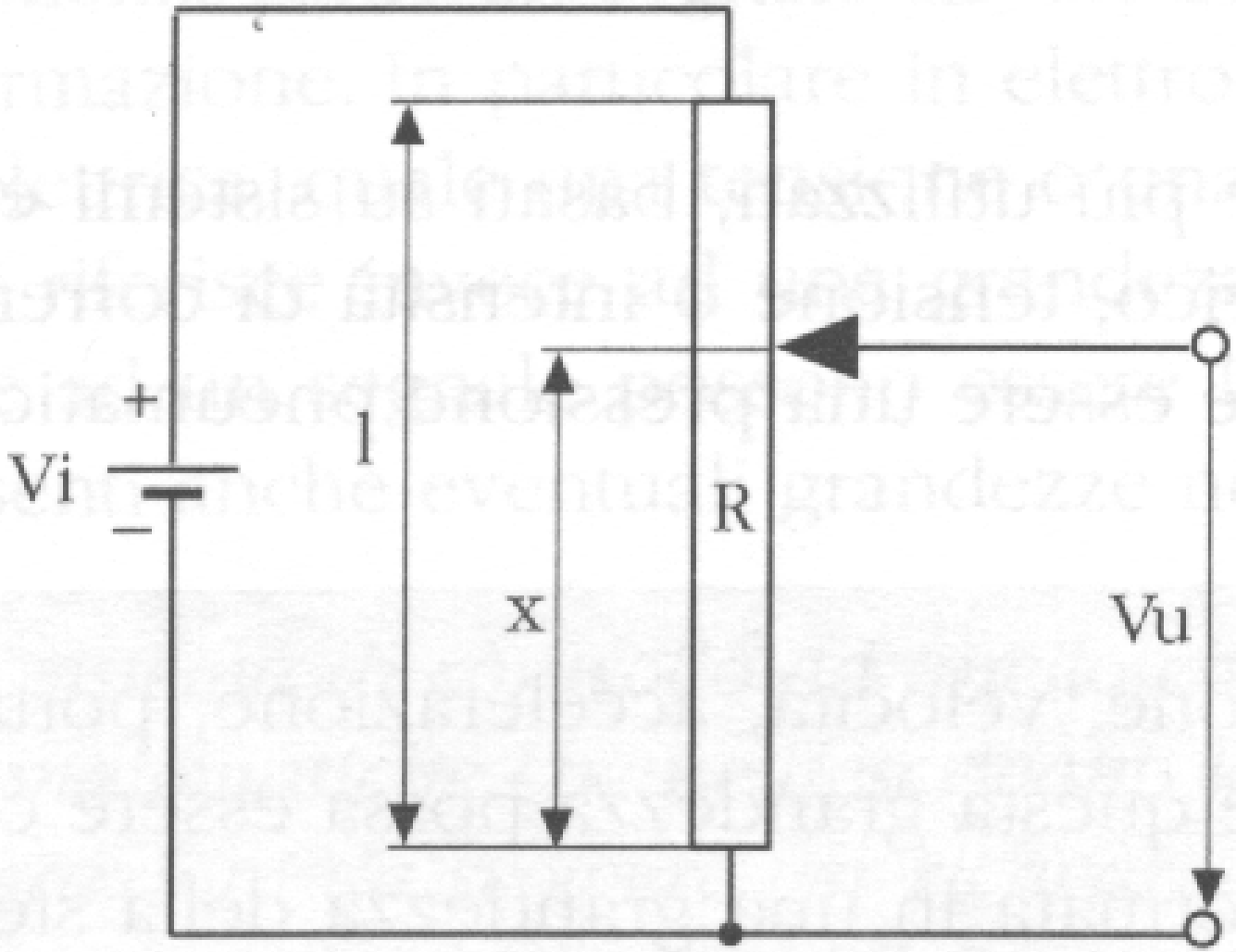
5.7

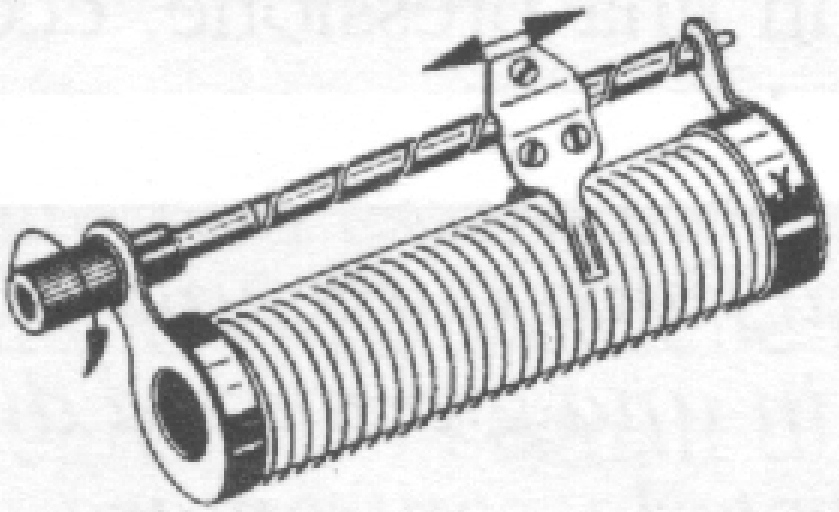


6.7

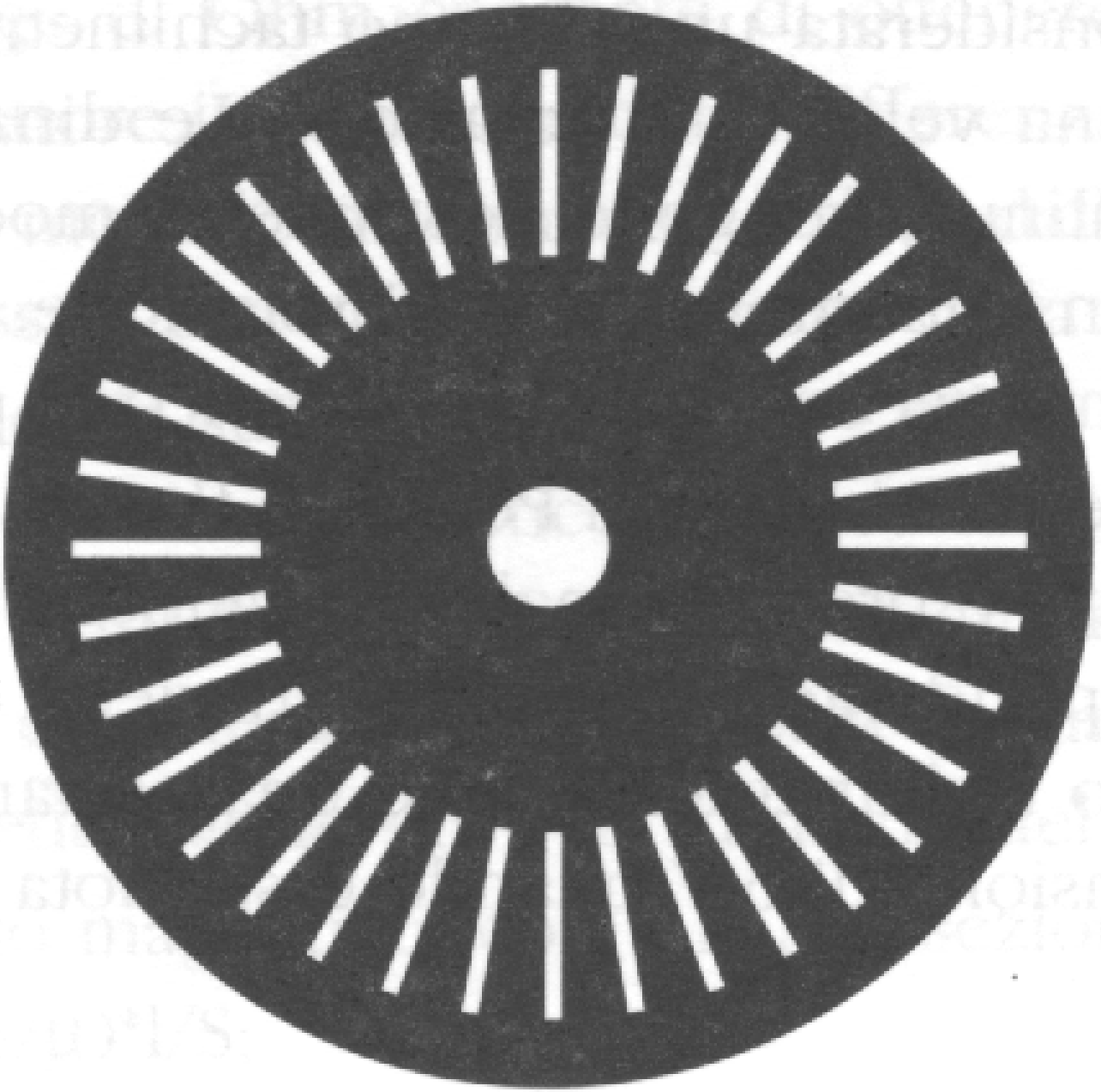


7.7

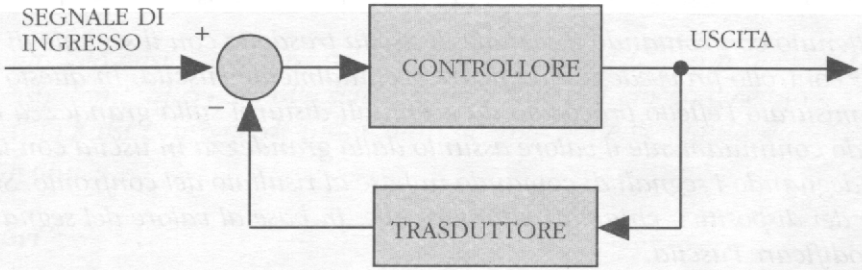




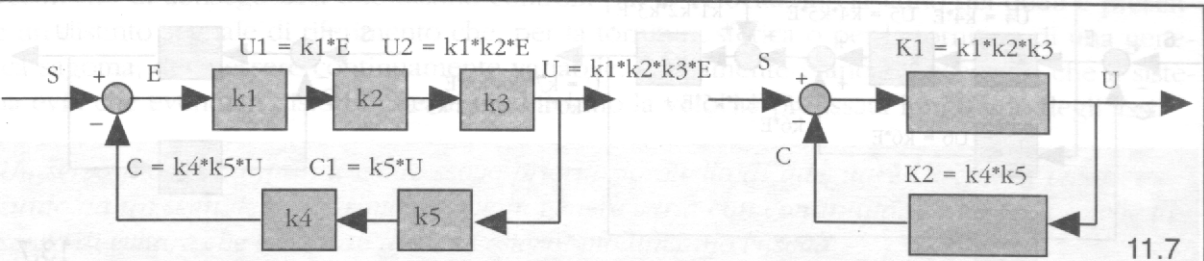
8.7

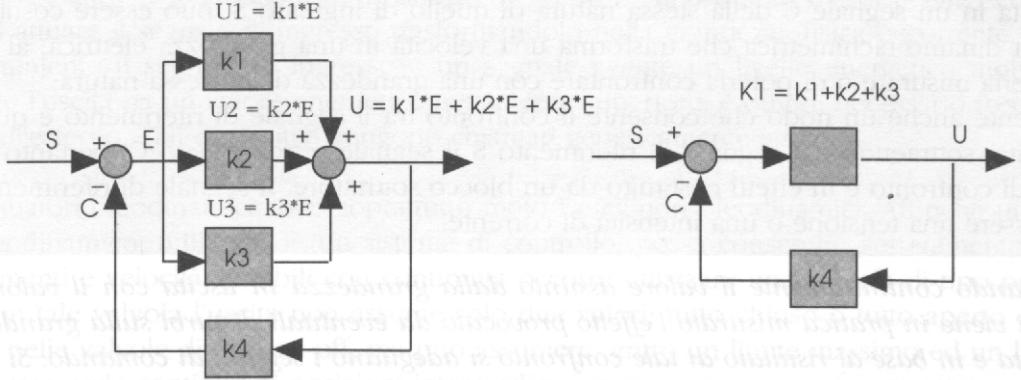


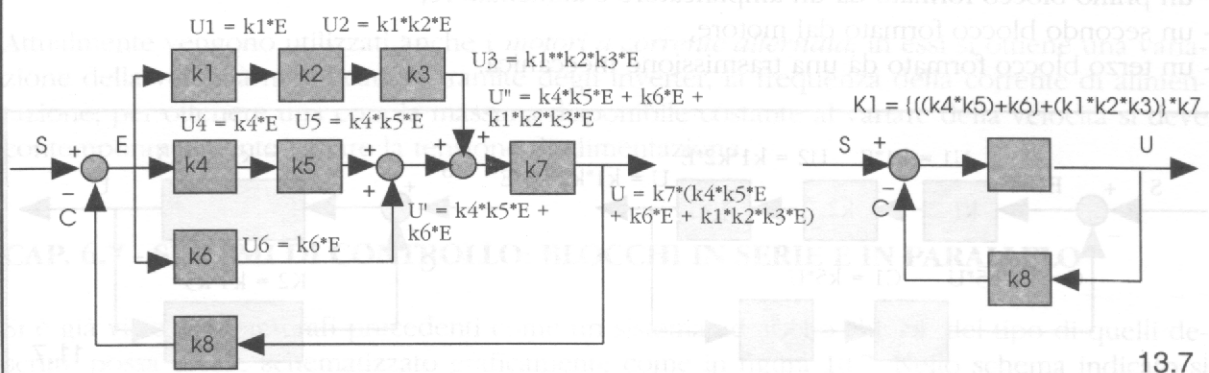
9.7

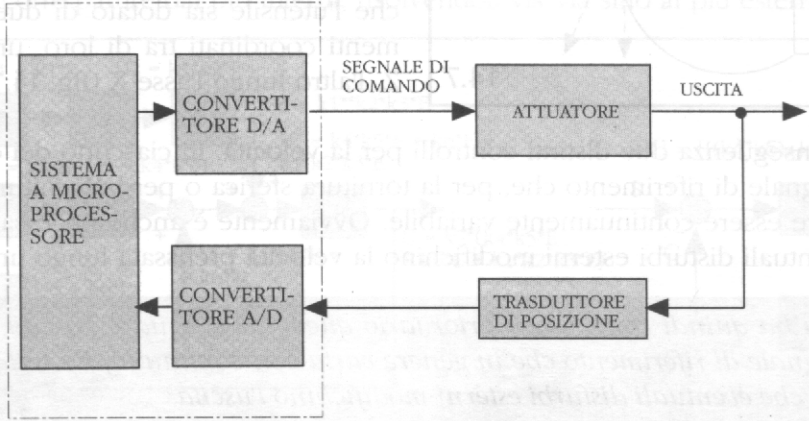


10.7

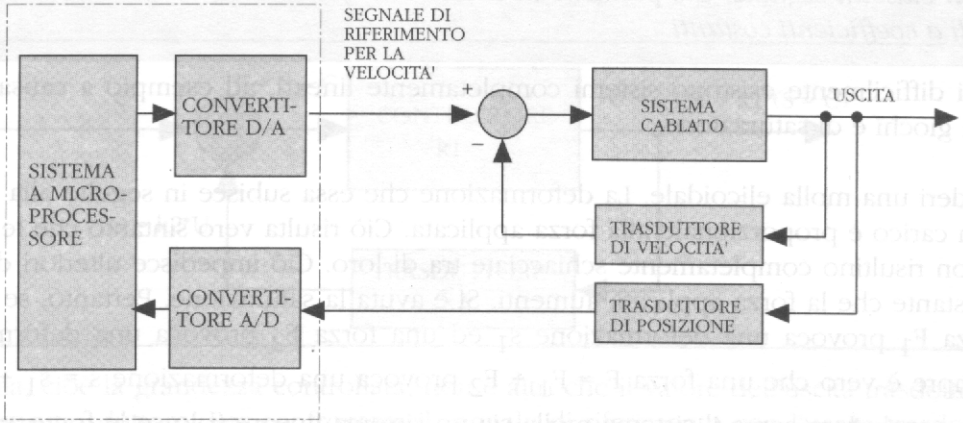

U1 = k1*E
U2 = k1*k2*E
U = k1*k2*k3*E
S
+
E
−
k1
k2
k3
C = k4*k5*U
C1 = k5*U
k4
k5
S
+
−
C
K1 = k1*k2*k3
U
K2 = k4*k5

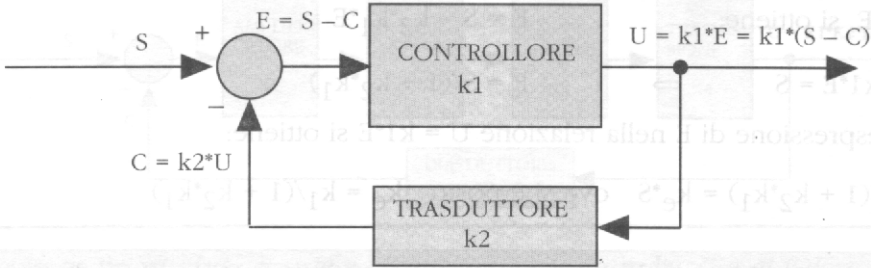

U1 = k1*E
k1
U2 = k2*E
U = k1*E + k2*E + k3*E
S
+
E
k2
+
+
C
−
+
U3 = k3*E
k3
k4
K1 = k1+k2+k3
S
+
U
C
−
k4

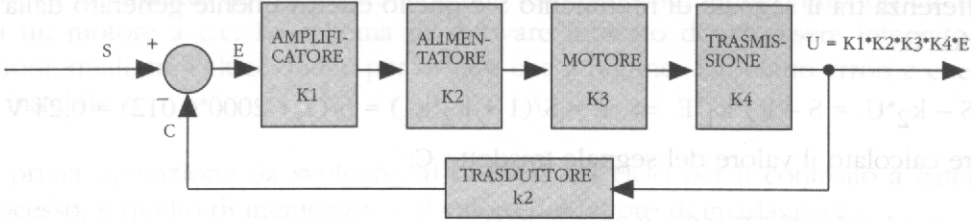

U1 = k1*E
U2 = k1*k2*E
k1
k2
k3
U3 = k1**k2*k3*E
U" = k4*k5*E + k6*E +
k1*k2*k3*E
U4 = k4*E
U5 = k4*k5*E
S
+
E
k4
k5
+
+
+
k7
U = k7*(k4*k5*E
+ k6*E + k1*k2*k3*E)
−
C
+
U' = k4*k5*E +
k6*E
k6
U6 = k6*E
k8
K1 = {((k4*k5)+k6)+(k1*k2*k3)}*k7
S
+
U
−
C
k8

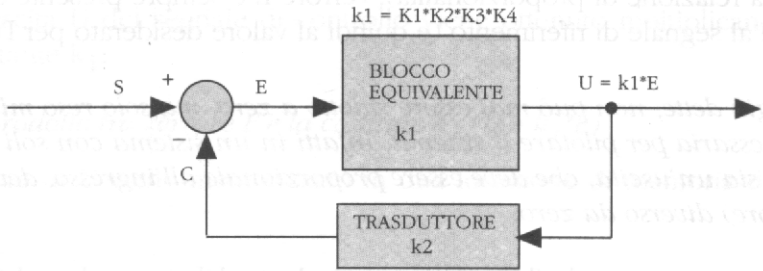

SISTEMA A MICRO-PROCES-SORE
CONVERTI-TORE D/A
SEGNALE DI COMANDO
ATTUATORE
USCITA
CONVERTI-TORE A/D
TRASDUTTORE DI POSIZIONE

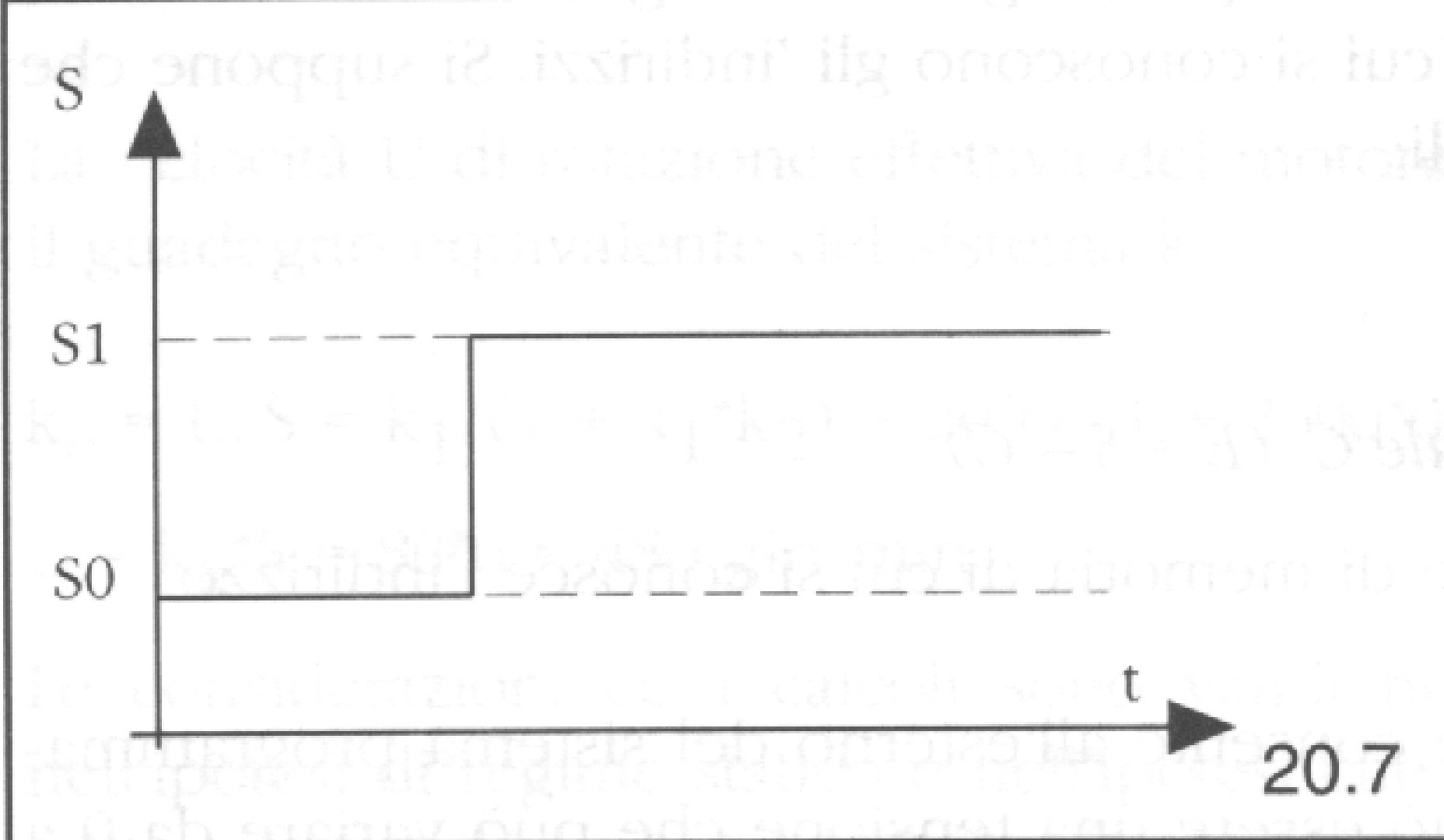
15.7

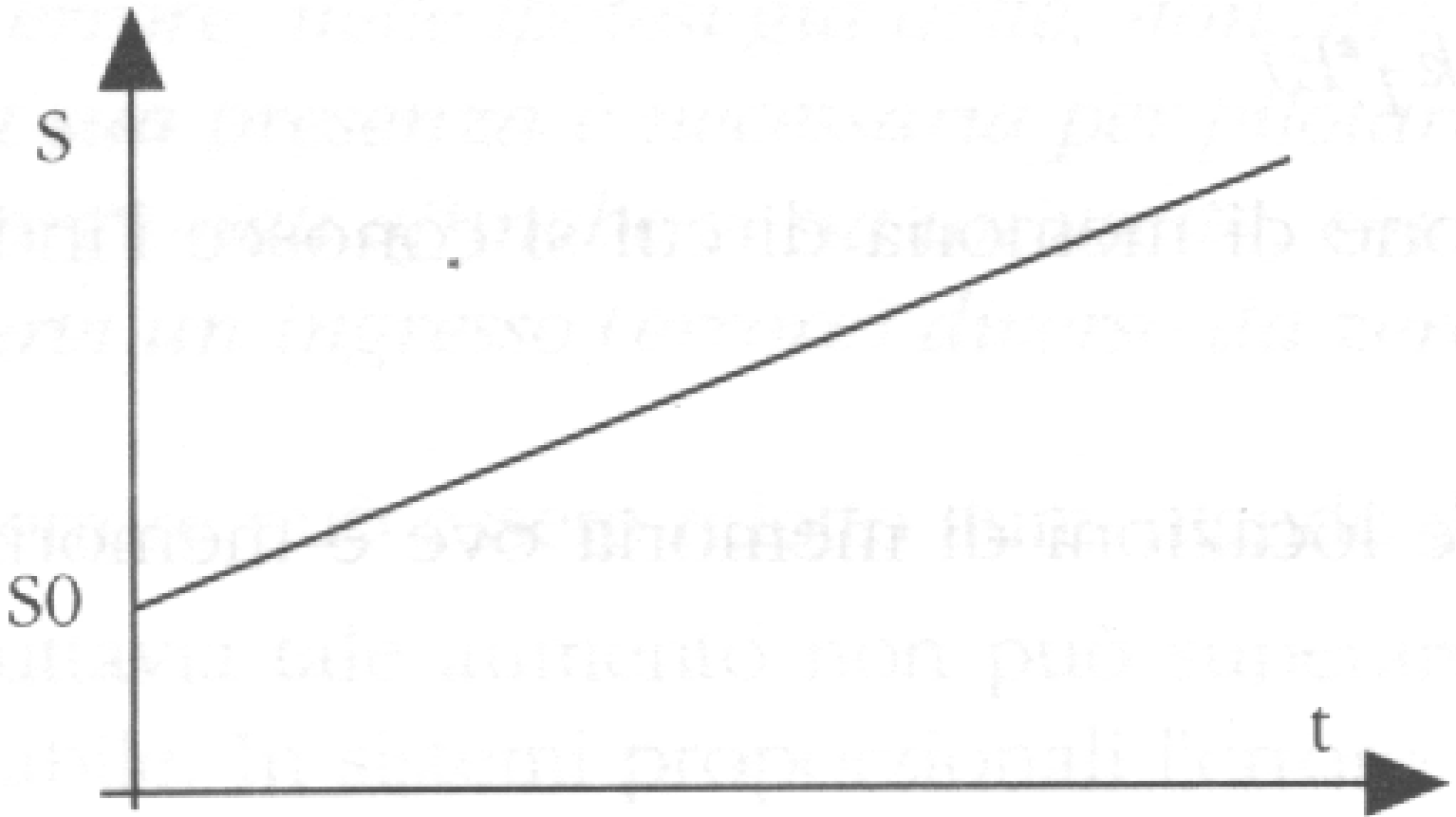

SEGNALE DI RIFERIMENTO PER LA VELOCITA'
+
−
SISTEMA A MICRO-PROCES-SORE
CONVERTI-TORE D/A
CONVERTI-TORE A/D
SISTEMA CABLATO
USCITA
TRASDUTTORE DI VELOCITA'
TRASDUTTORE DI POSIZIONE


S
+
E = S – C
–
CONTROLLORE
k1
U = k1*E = k1*(S – C)
C = k2*U
TRASDUTTORE
k2

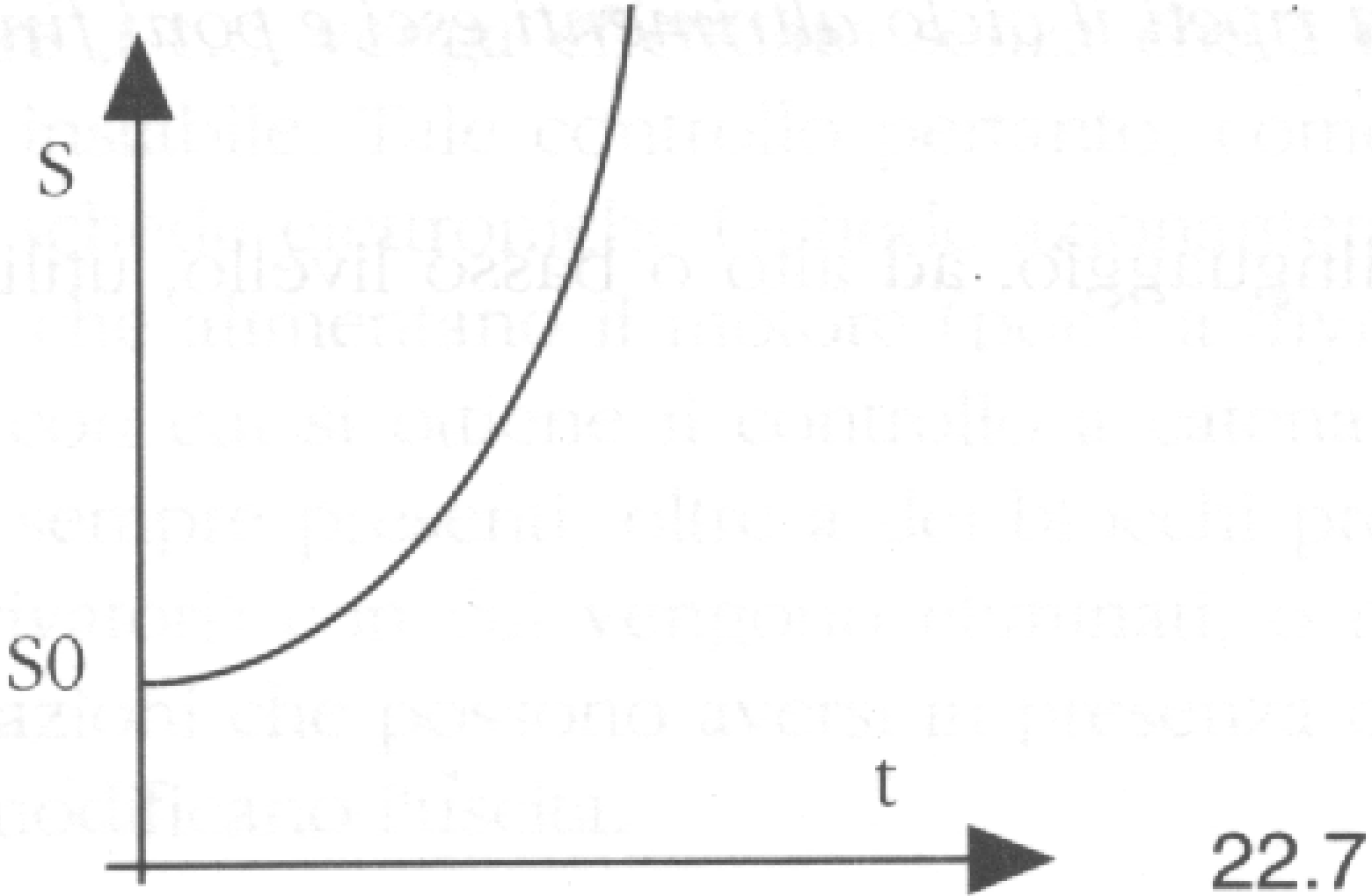

S
+
E
AMPLIFI-
CATORE
K1
ALIMEN-
TATORE
K2
MOTORE
K3
TRASMIS-
SIONE
K4
U = K1*K2*K3*K4*E
−
C
TRASDUTTORE
k2


k1 = K1*K2*K3*K4
S
+
−
E
BLOCCO
EQUIVALENTE
k1
U = k1*E
C
TRASDUTTORE
k2

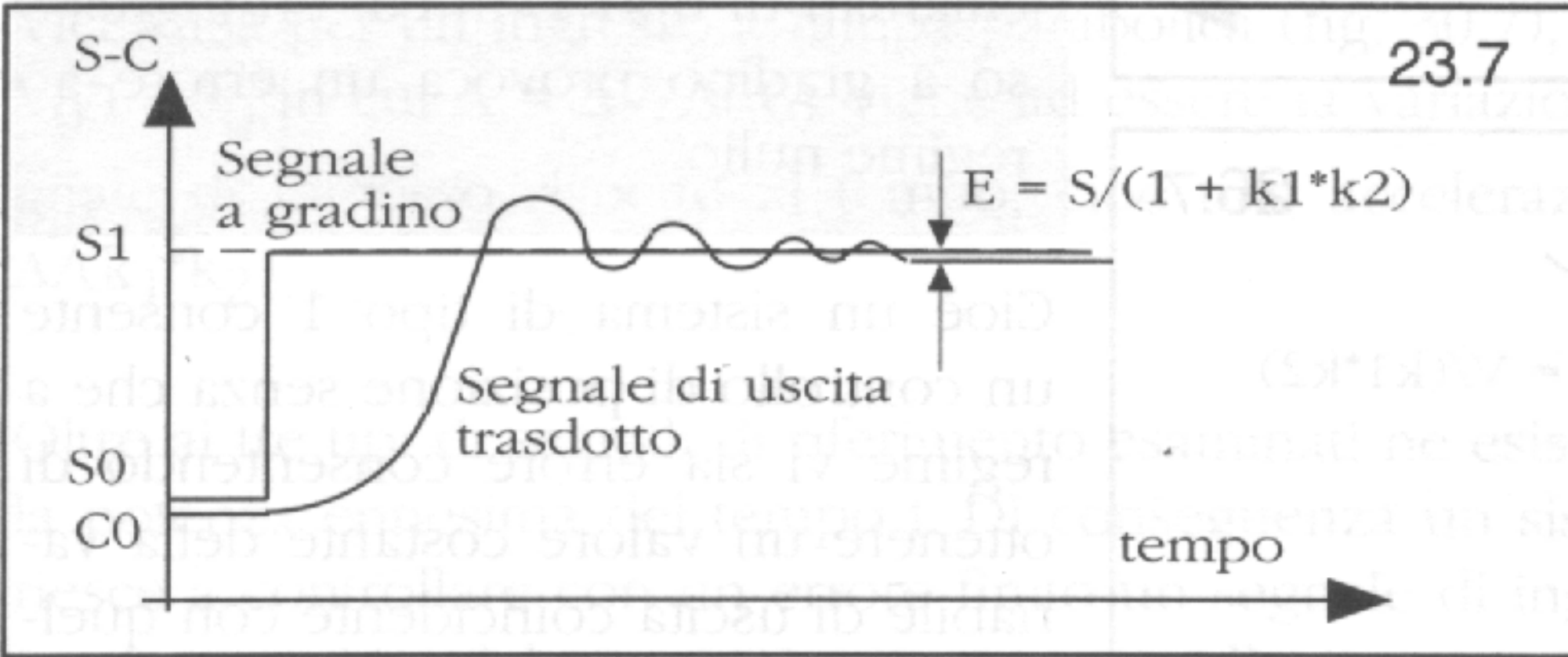

S
S1
S0
t
20.7

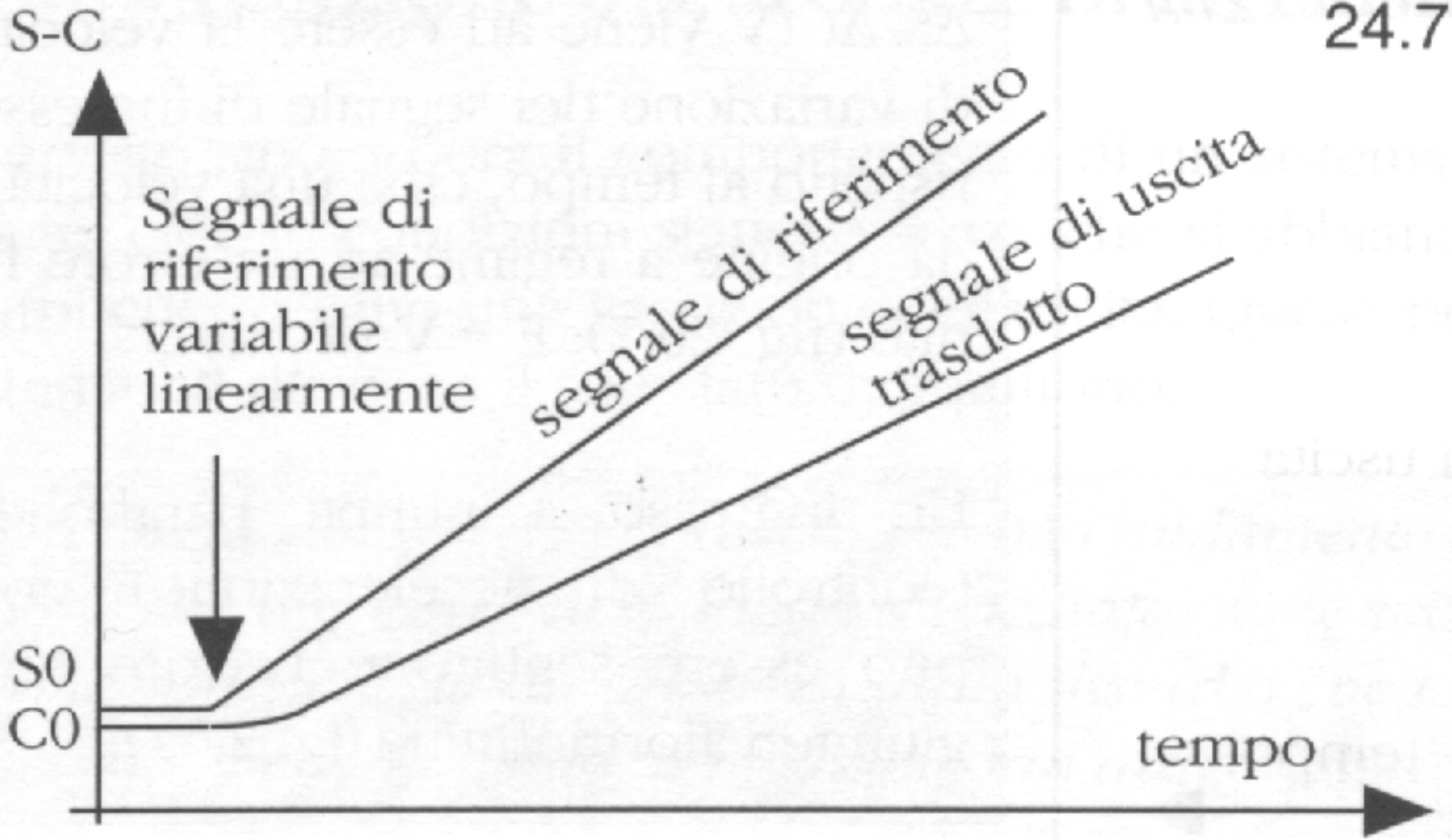


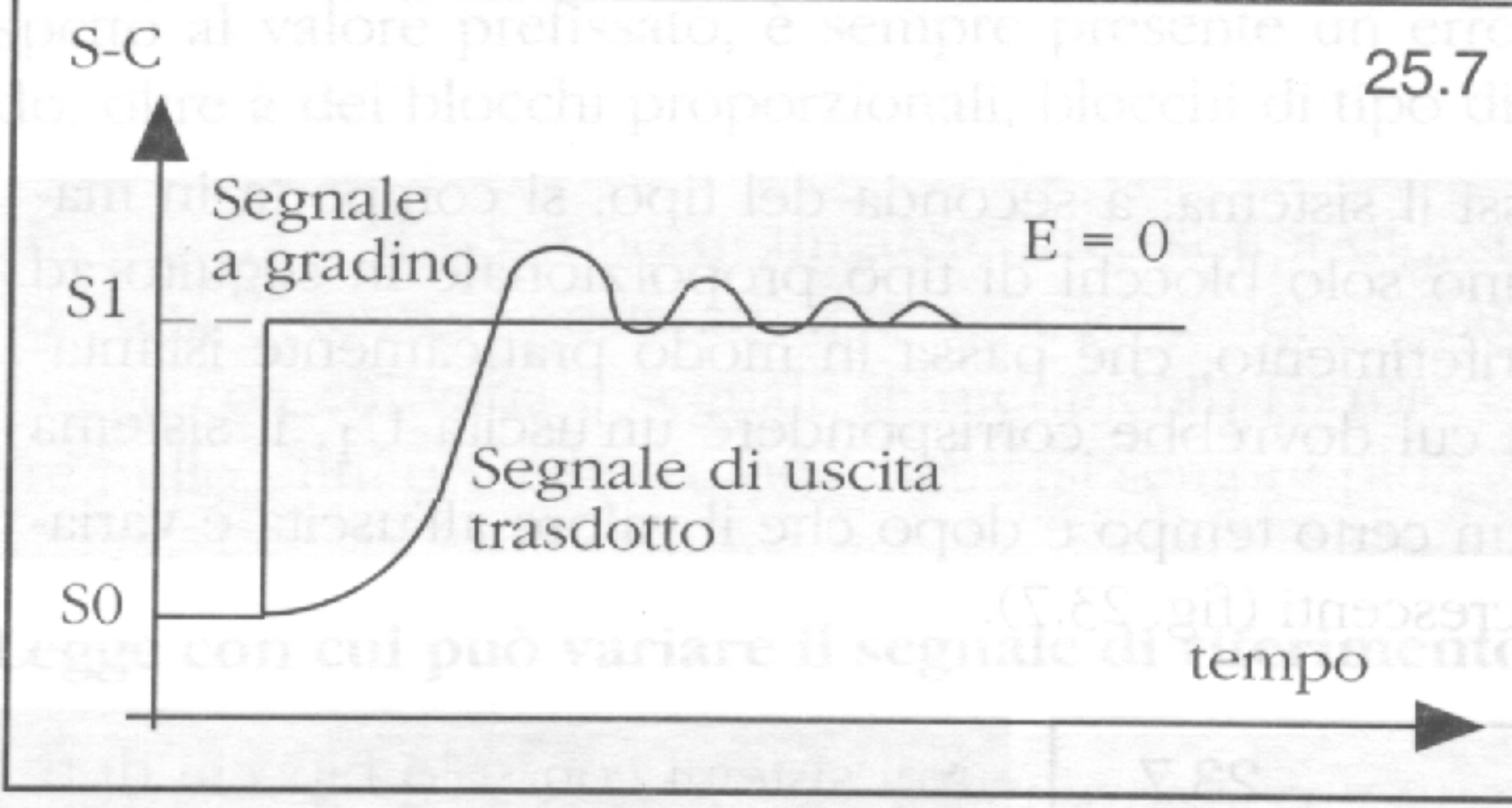
21.7

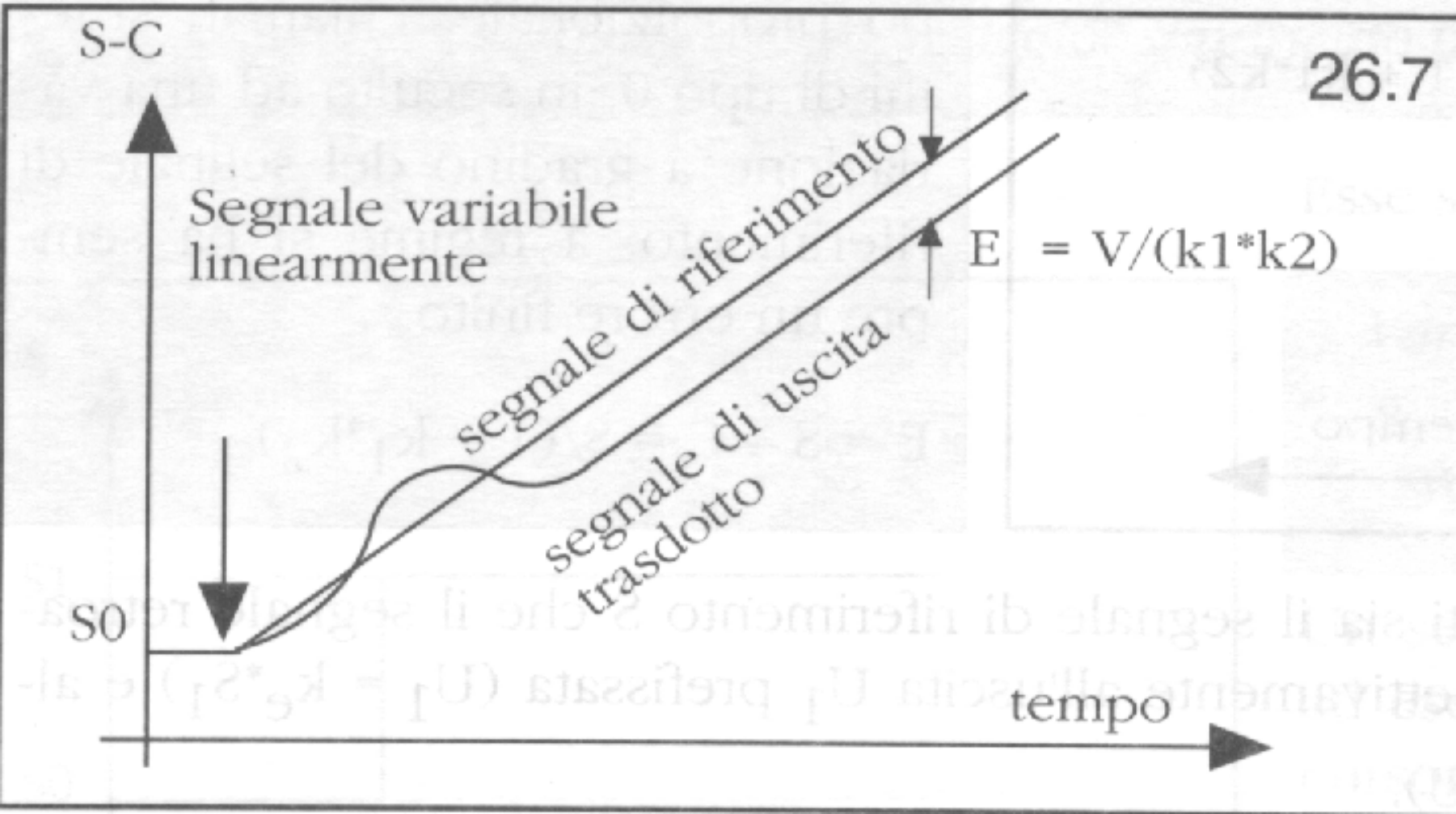


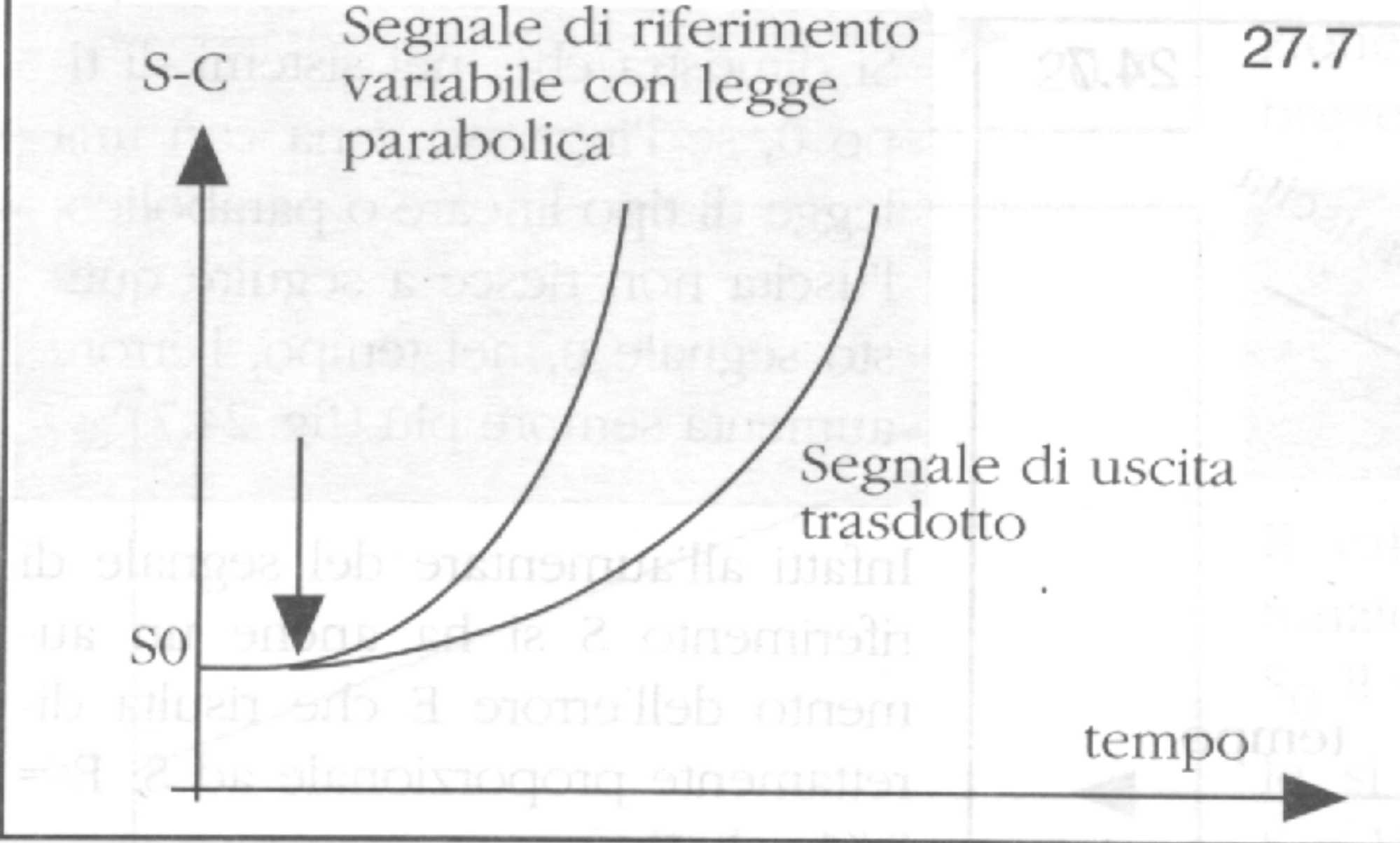
22.7

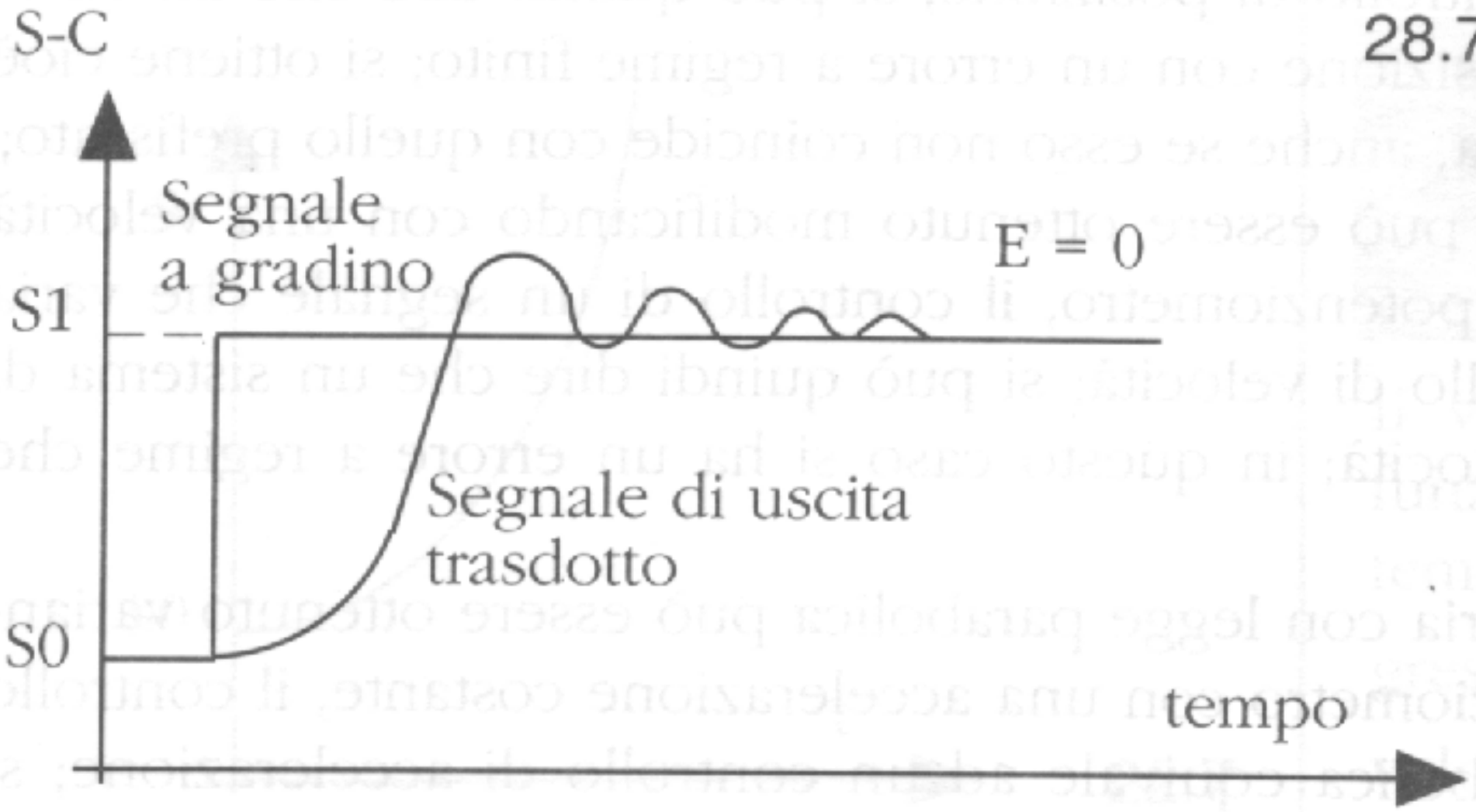

S-C
Segnale
a gradino
E = S/(1 + k1*k2)
S1
Segnale di uscita
trasdotto
S0
C0
tempo

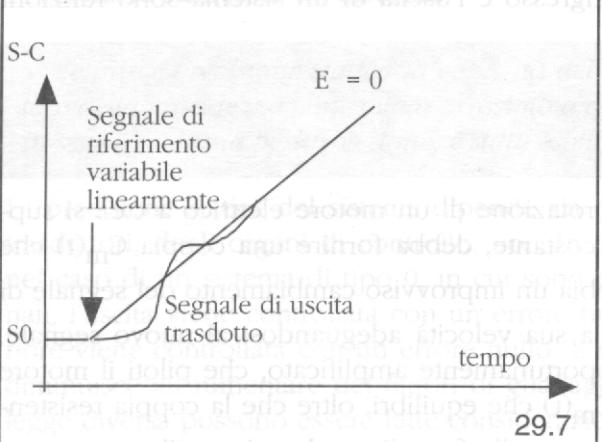

S-C
Segnale di riferimento variabile linearmente
segnale di riferimento
segnale di uscita trasdotto
S0
C0
tempo


S-C
25.7
Segnale
a gradino
E = 0
S1
Segnale di uscita
trasdotto
S0
tempo

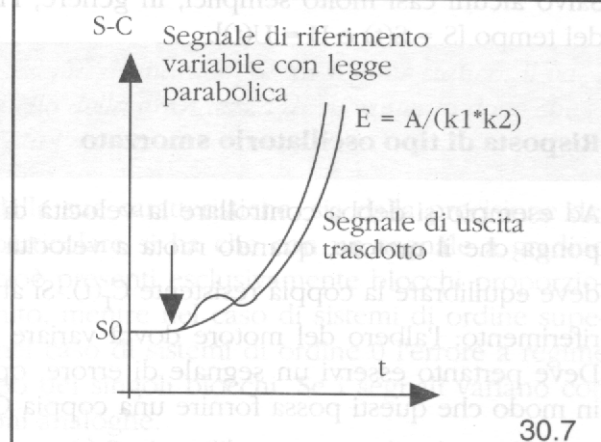

S-C
26.7
Segnale variabile
linearmente
segnale di riferimento
E = V/(k1*k2)
segnale di uscita
trasdotto
S0
tempo


Segnale di riferimento
variabile con legge
parabolica
S-C
Segnale di uscita
trasdotto
S0
tempo

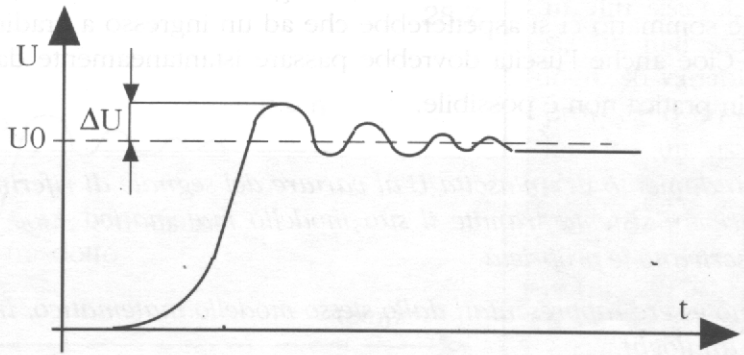

S-C
Segnale
a gradino
E = 0
S1
Segnale di uscita
trasdotto
S0
tempo

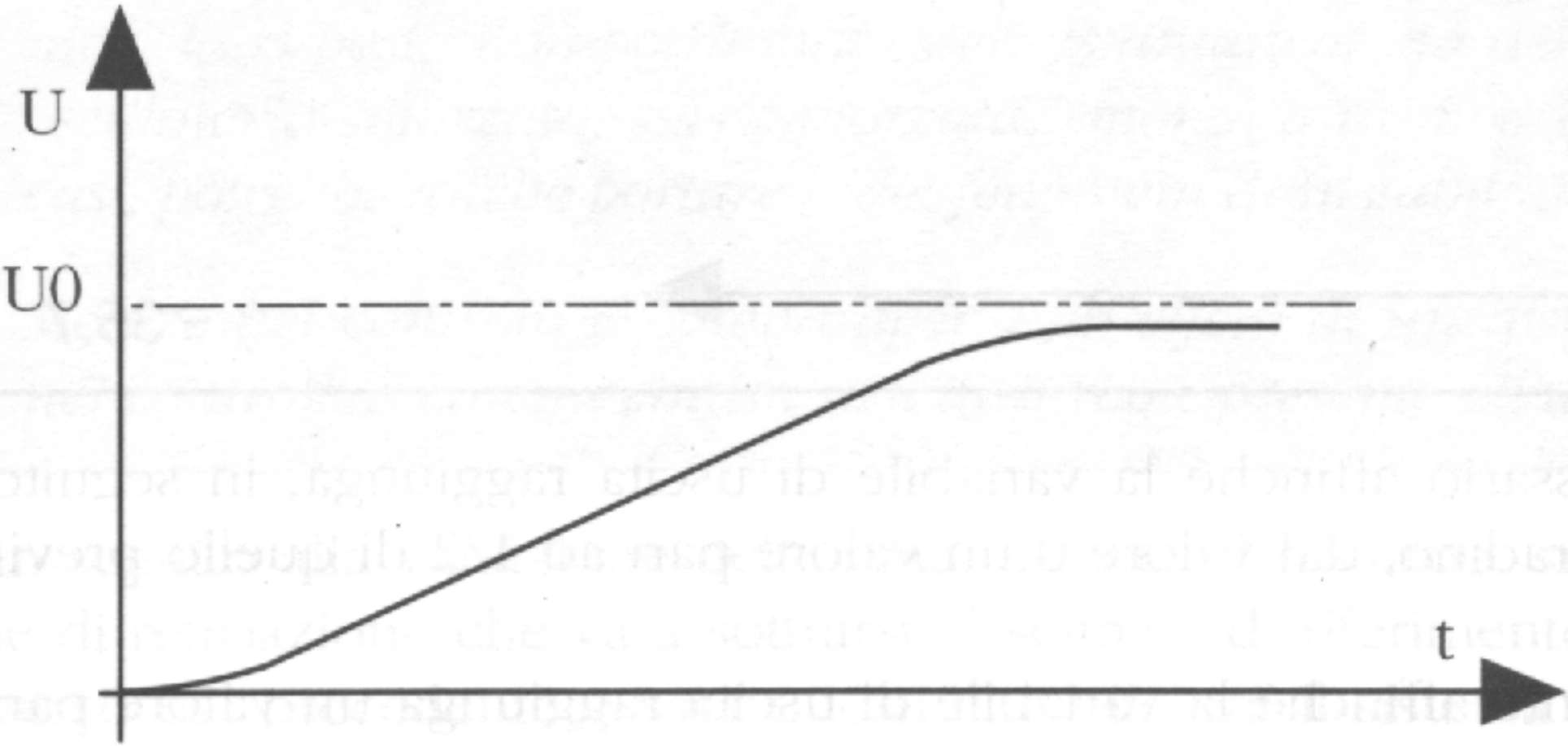

S-C
E = 0
Segnale di riferimento variabile linearmente
Segnale di uscita trasdotto
S0
tempo

29.7

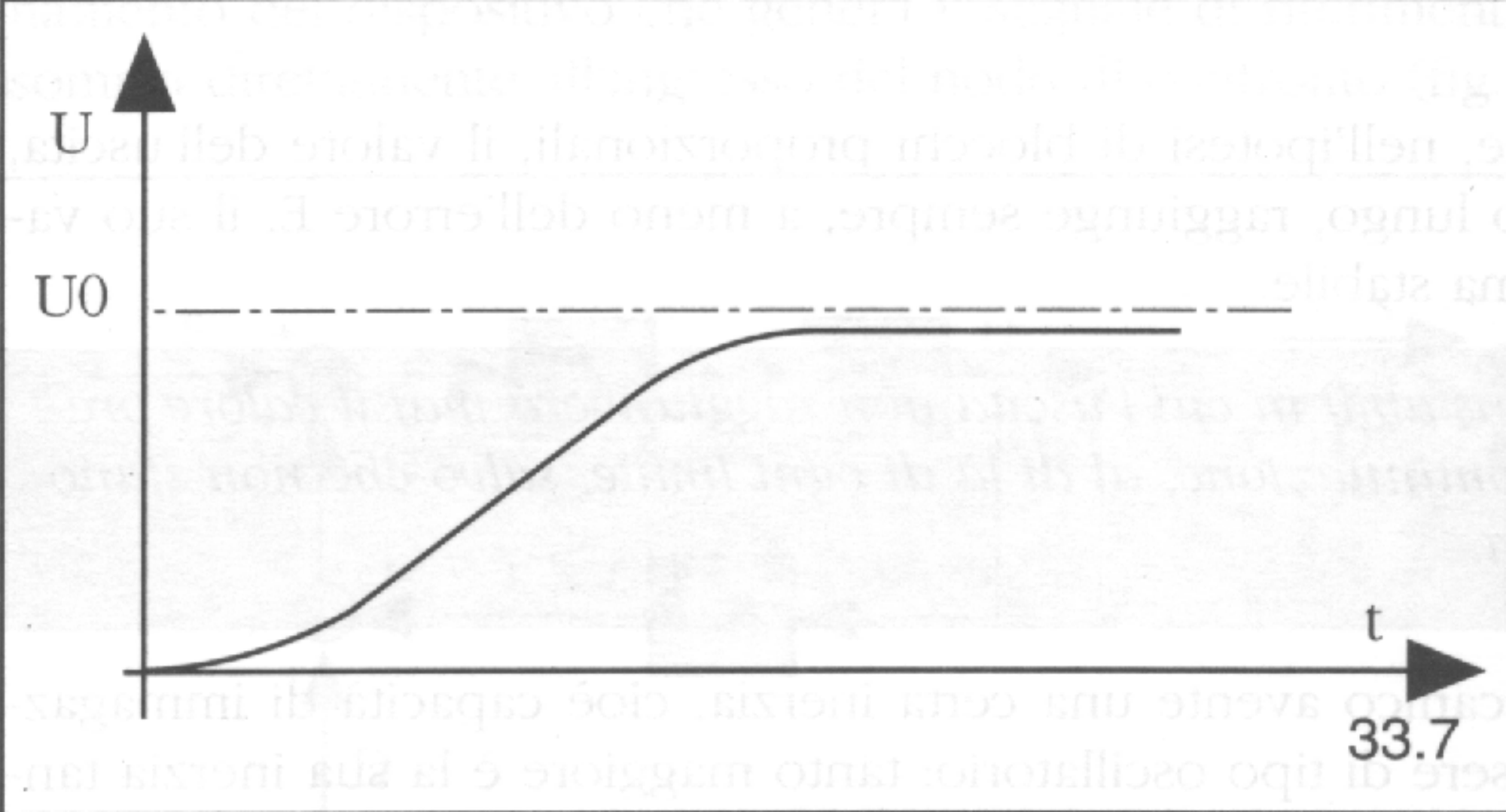

S-C
Segnale di riferimento variabile con legge parabolica
E = A/(k1*k2)
Segnale di uscita trasdotto
S0
t

30.7

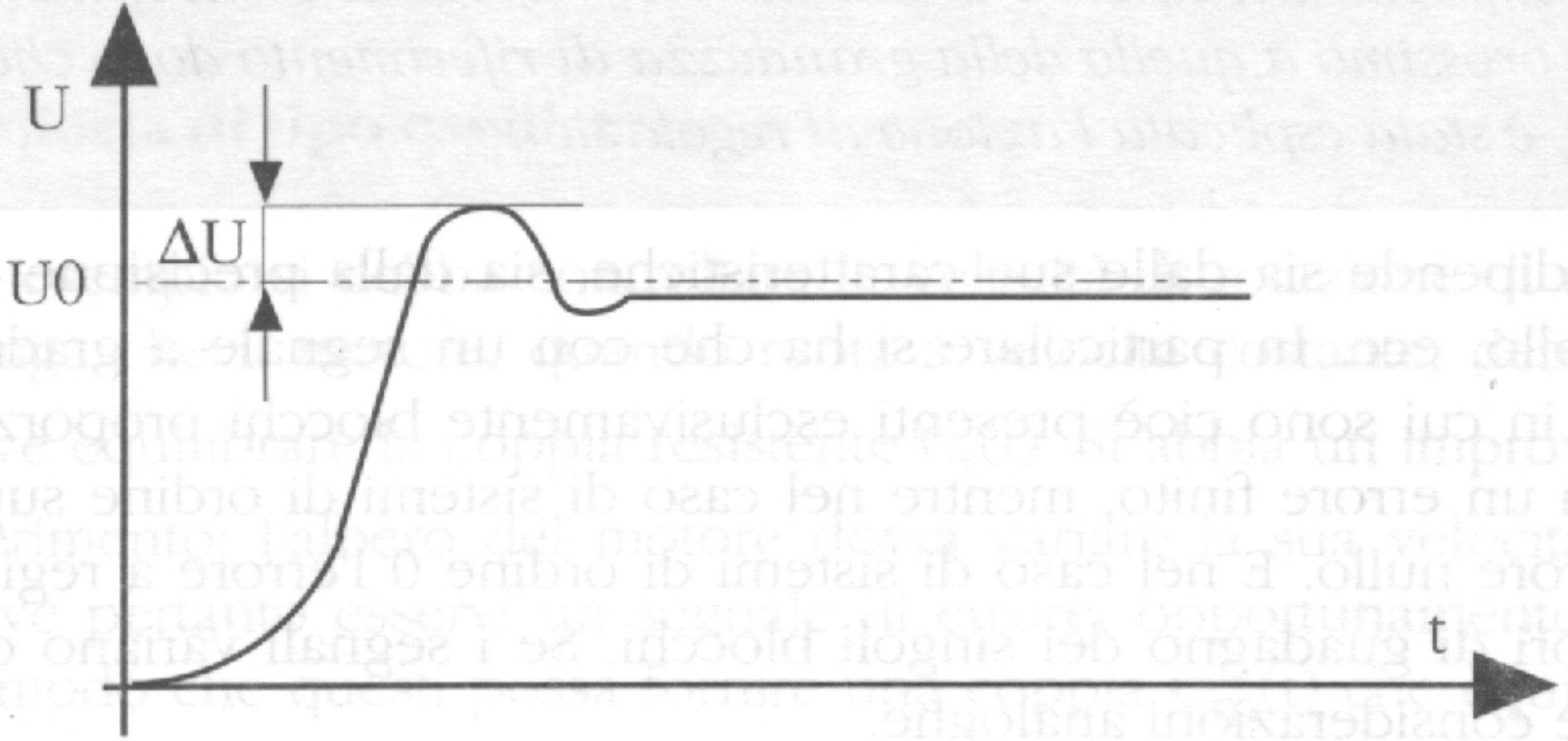

U
ΔU
U0
t



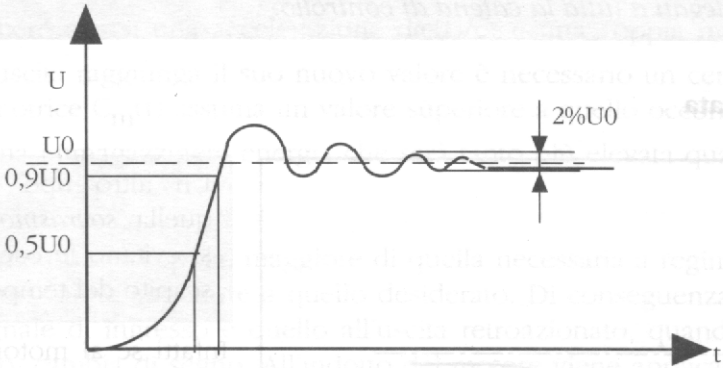
32.7

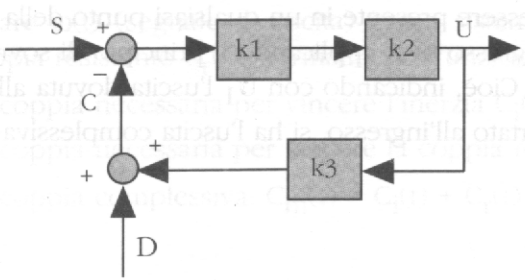


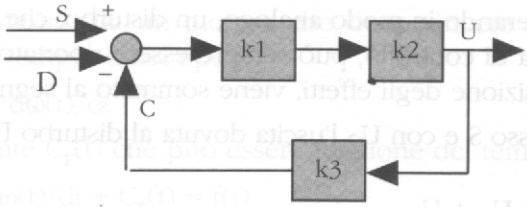
33.7

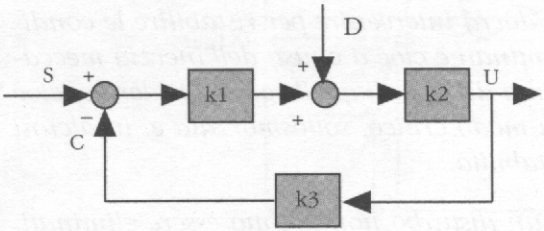


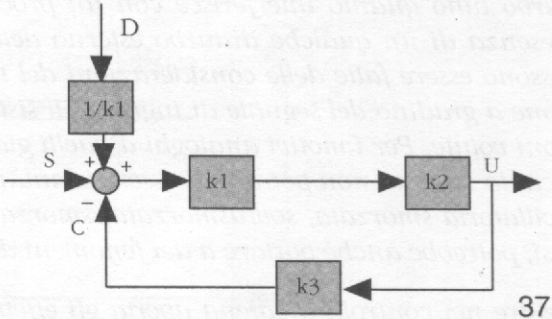
34.7

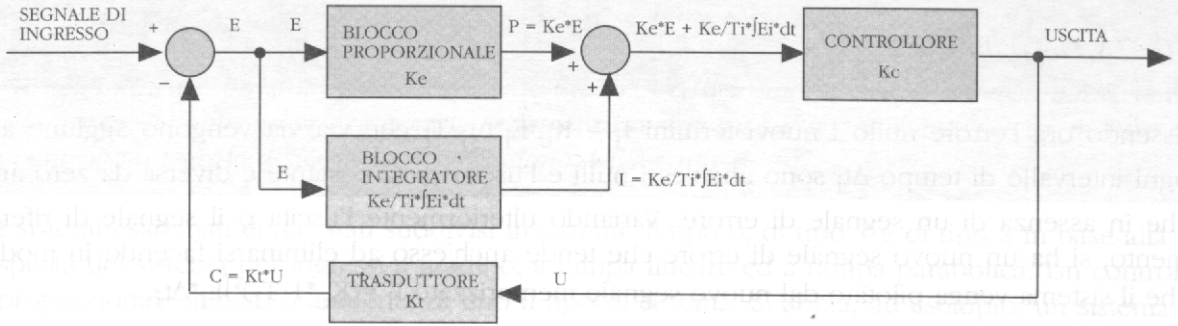

U
U0
0,9U0
0,5U0
2%U0
t

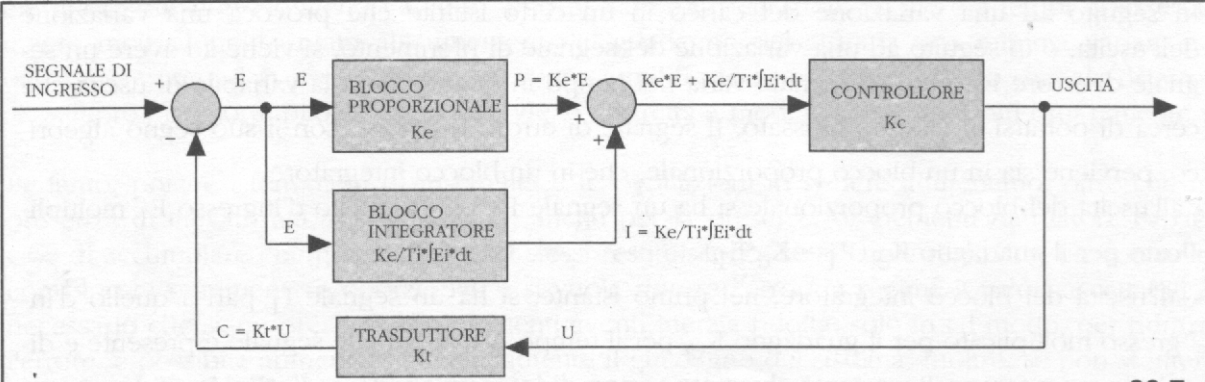

S
+
k1
k2
U
−
C
+
+
k3
D

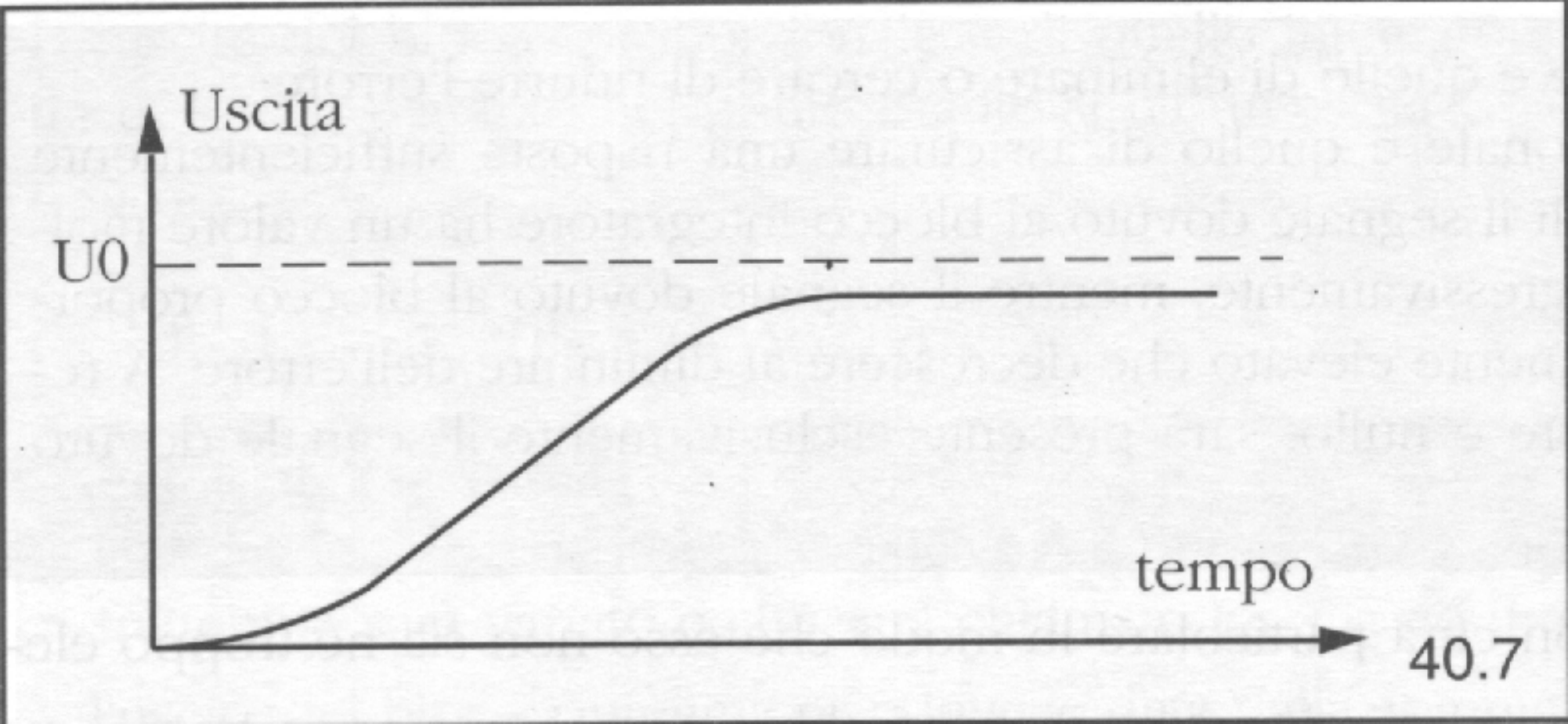

S
+
D
−
C
k1
k2
U
k3

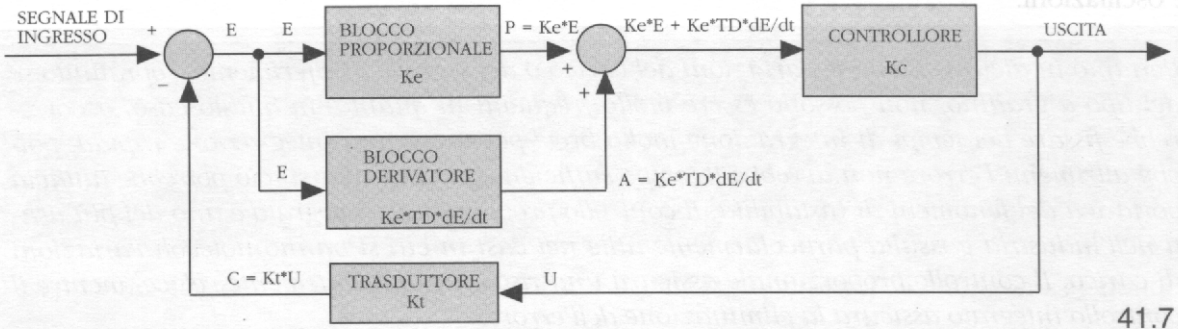

S
+
−
C
k1
D
+
+
k2
U
k3

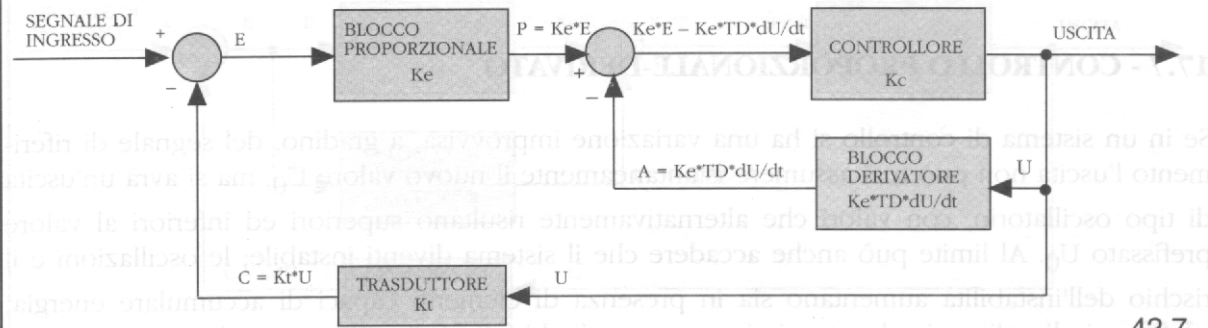

D
1/k1
S
+
+
−
C
k1
k2
U
k3

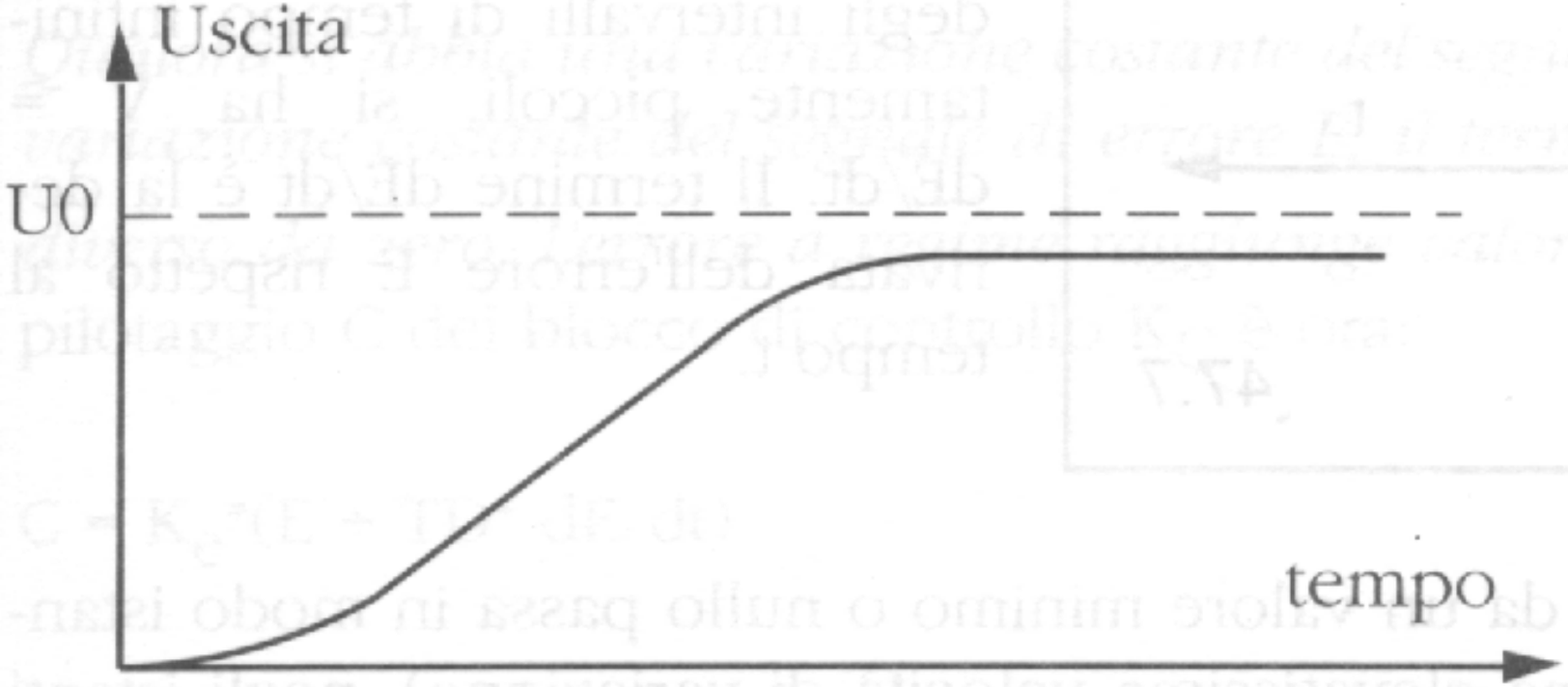

SEGNALE DI INGRESSO
+
−
E
E
BLOCCO PROPORZIONALE
Ke
P = Ke*E
+
+
Ke*E + Ke/Ti*∫Ei*dt
CONTROLLORE
Kc
USCITA
E
BLOCCO INTEGRATORE
Ke/Ti*∫Ei*dt
I = Ke/Ti*∫Ei*dt
C = Kt*U
TRASDUTTORE
Kt
U


SEGNALE DI INGRESSO
+
−
E
E
BLOCCO PROPORZIONALE Ke
P = Ke*E
+
+
Ke*E + Ke/Ti*∫Ei*dt
CONTROLLORE Kc
USCITA
E
BLOCCO INTEGRATORE Ke/Ti*∫Ei*dt
I = Ke/Ti*∫Ei*dt
C = Kt*U
TRASDUTTORE Kt
U

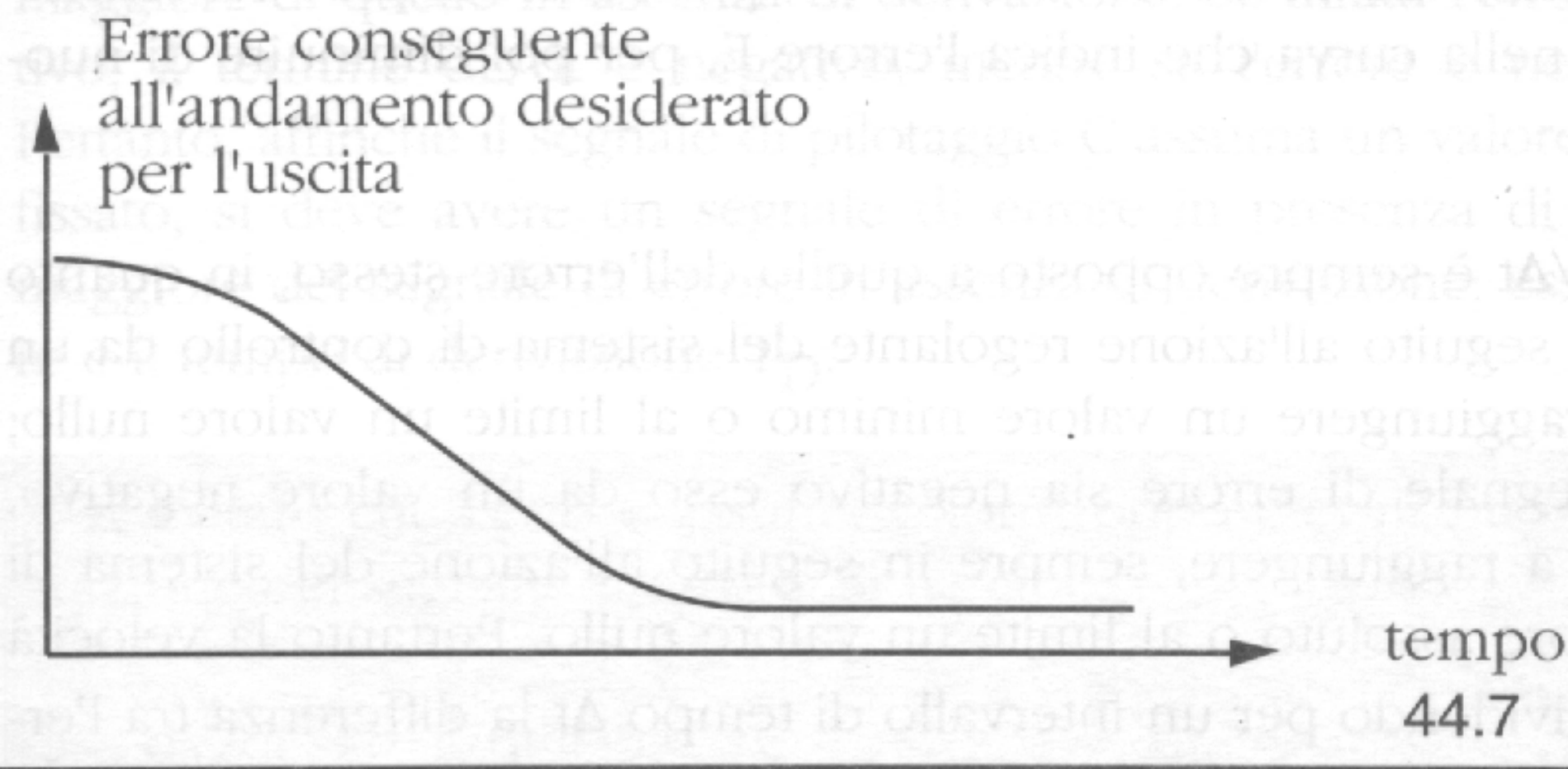

Uscita
U0
tempo
40.7


SEGNALE DI INGRESSO
+
−
E
E
BLOCCO PROPORZIONALE
Ke
P = Ke*E
+
+
Ke*E + Ke*TD*dE/dt
CONTROLLORE
Kc
USCITA
E
BLOCCO DERIVATORE
Ke*TD*dE/dt
A = Ke*TD*dE/dt
C = Kt*U
TRASDUTTORE
Kt
U

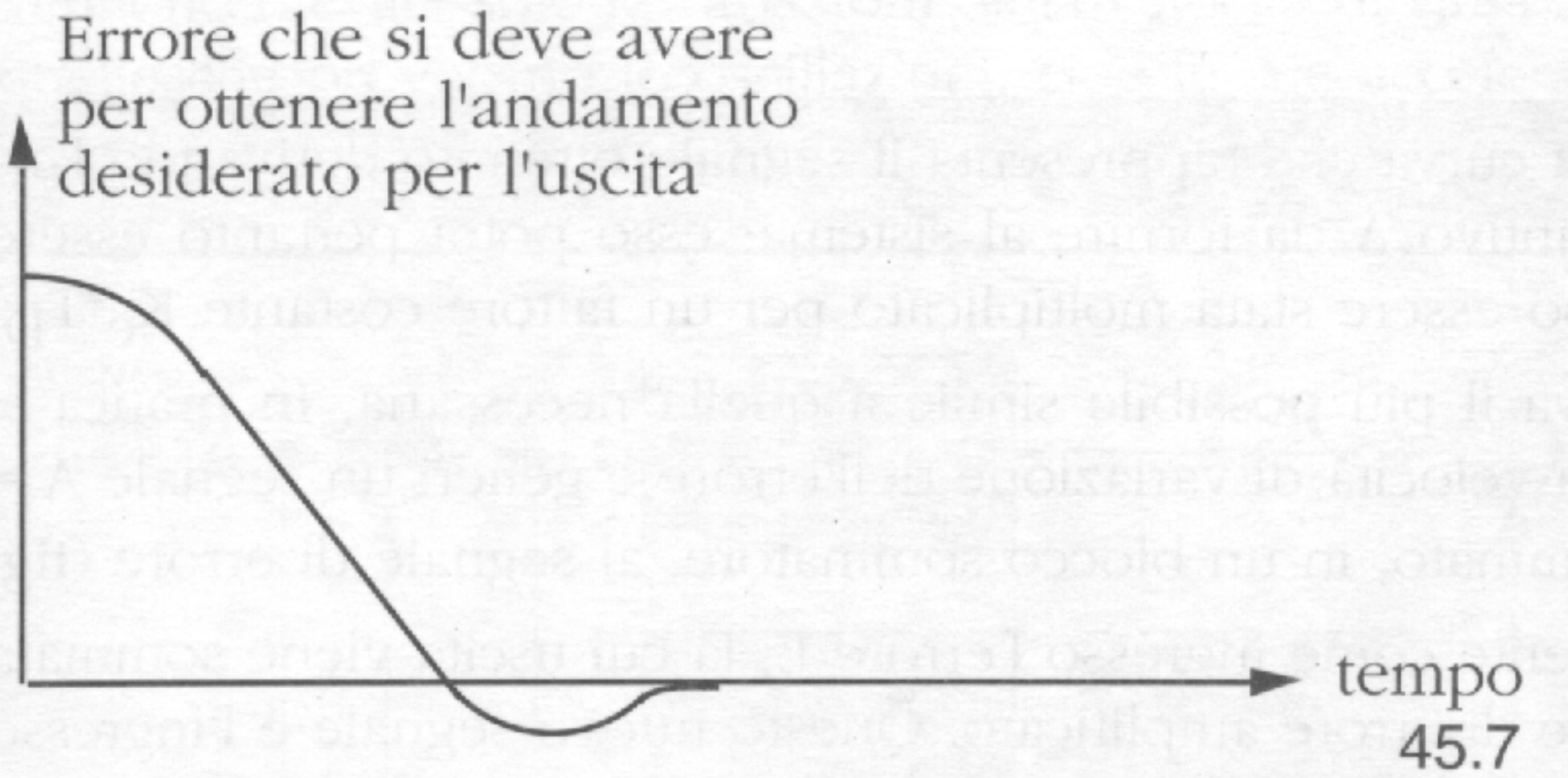

SEGNALE DI INGRESSO
+
−
E
BLOCCO PROPORZIONALE
Ke
P = Ke*E
Ke*E – Ke*TD*dU/dt
+
−
CONTROLLORE
Kc
USCITA
A = Ke*TD*dU/dt
BLOCCO DERIVATORE
Ke*TD*dU/dt
U
C = Kt*U
TRASDUTTORE
Kt
U


Uscita
U0
tempo

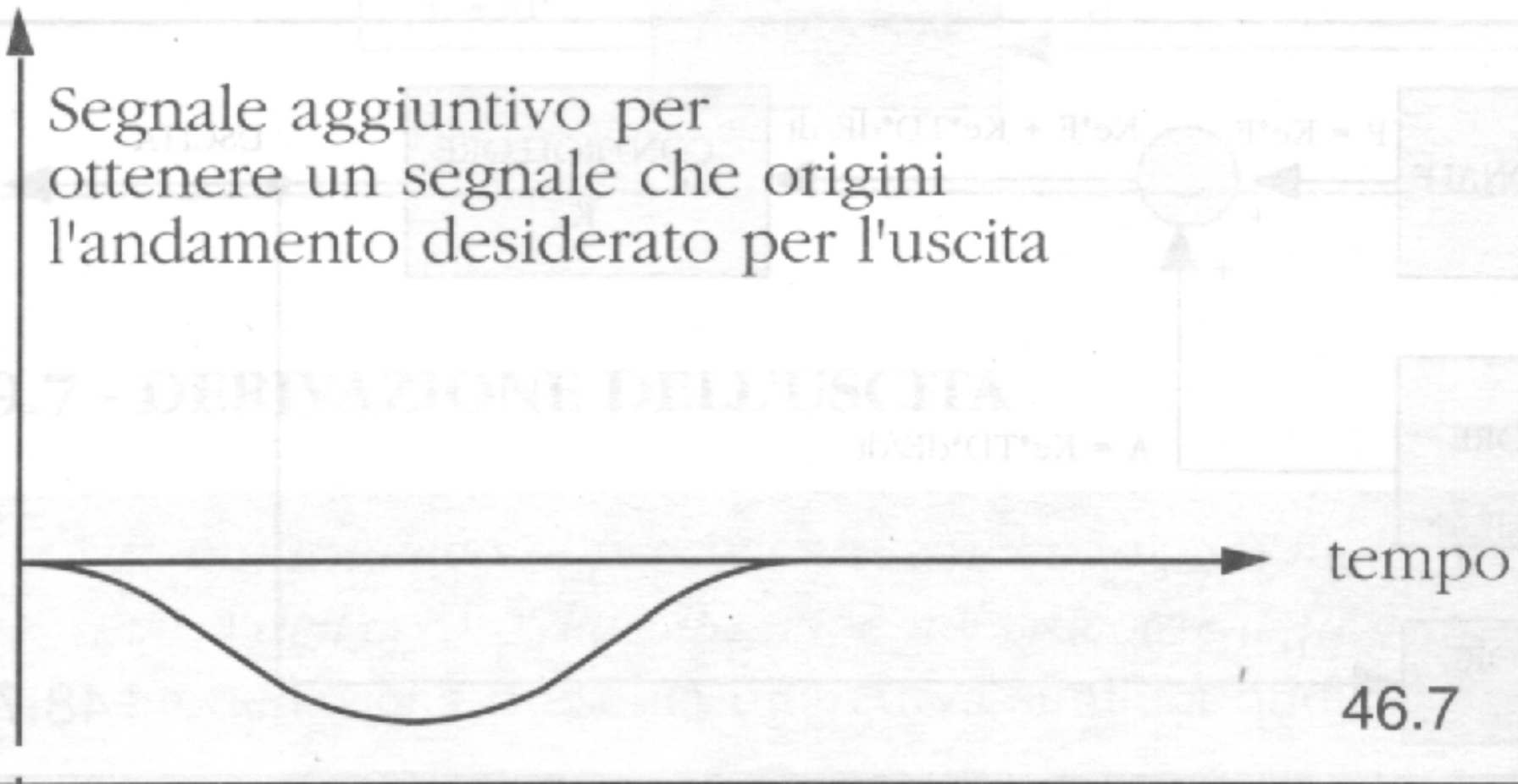
43.7


Errore conseguente
all'andamento desiderato
per l'uscita
tempo

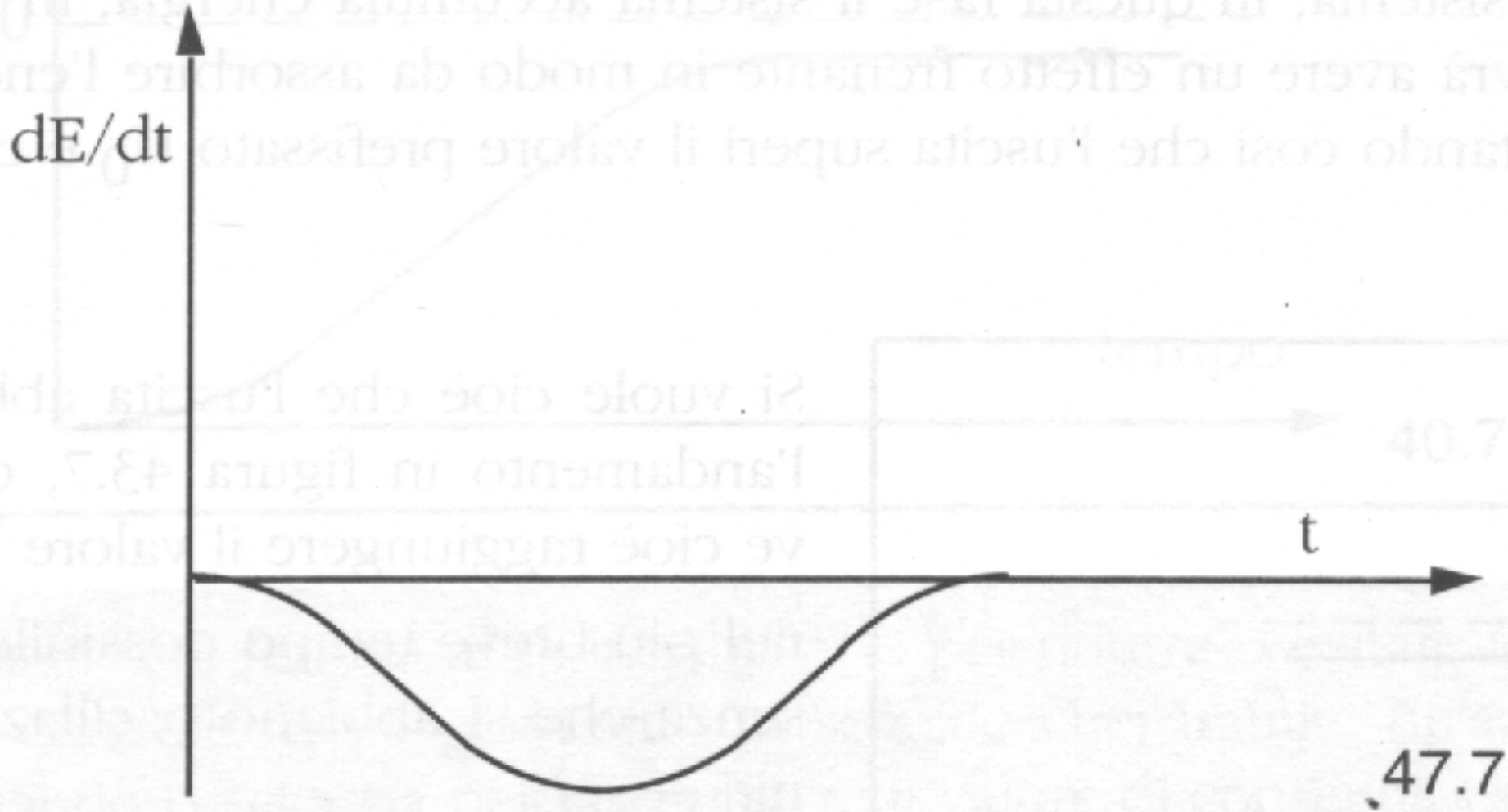
44.7


Errore che si deve avere
per ottenere l'andamento
desiderato per l'uscita
tempo

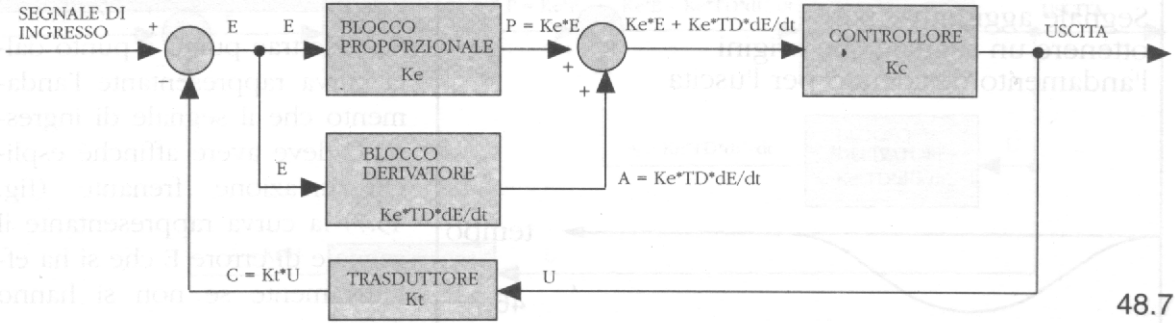
45.7

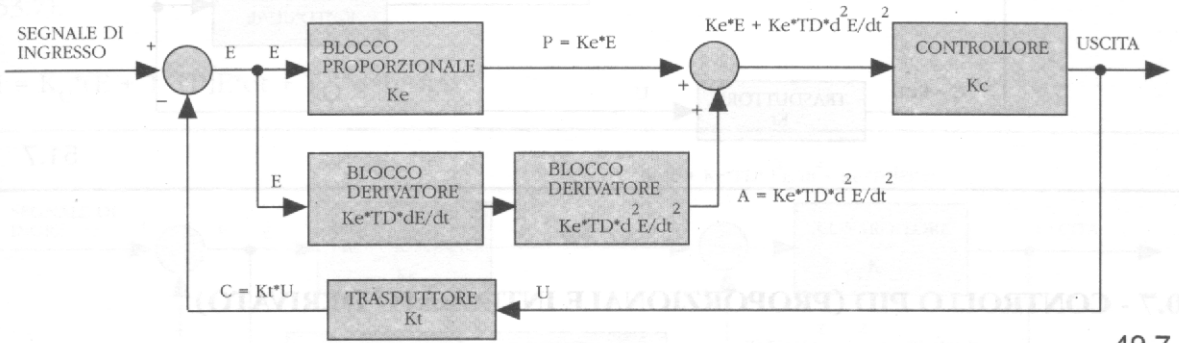

Segnale aggiuntivo per
ottenere un segnale che origini
l'andamento desiderato per l'uscita
tempo

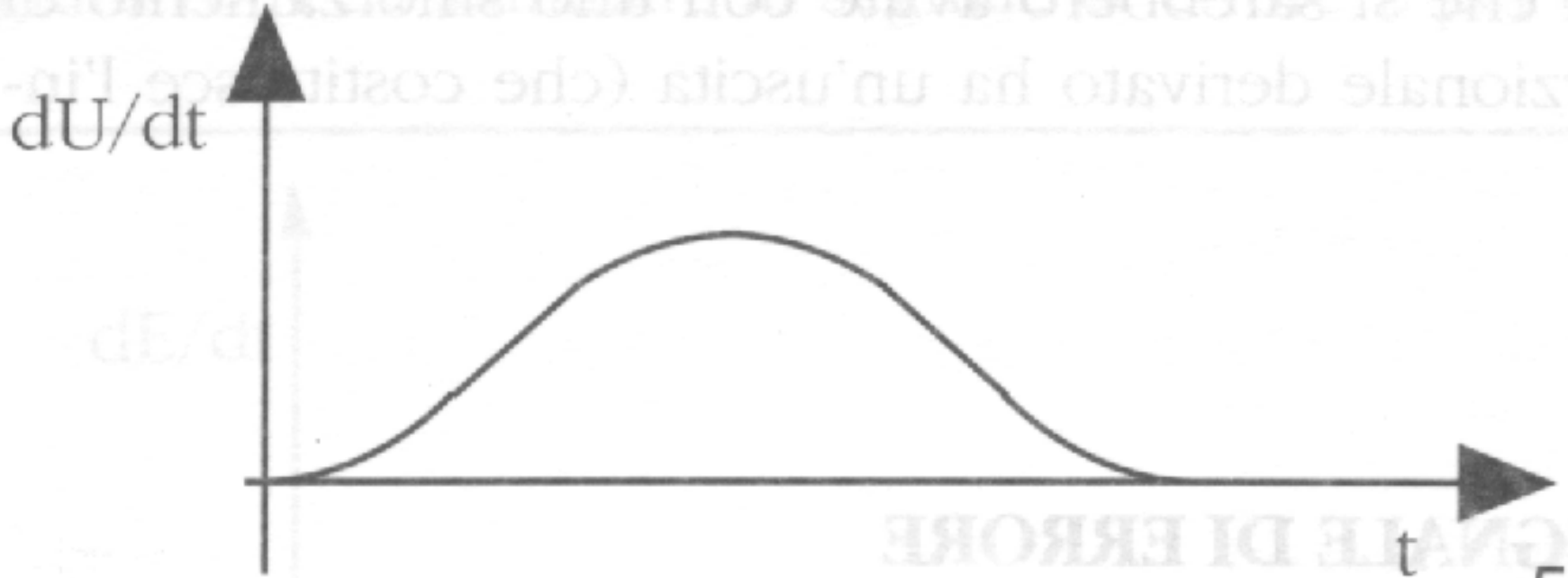
46.7



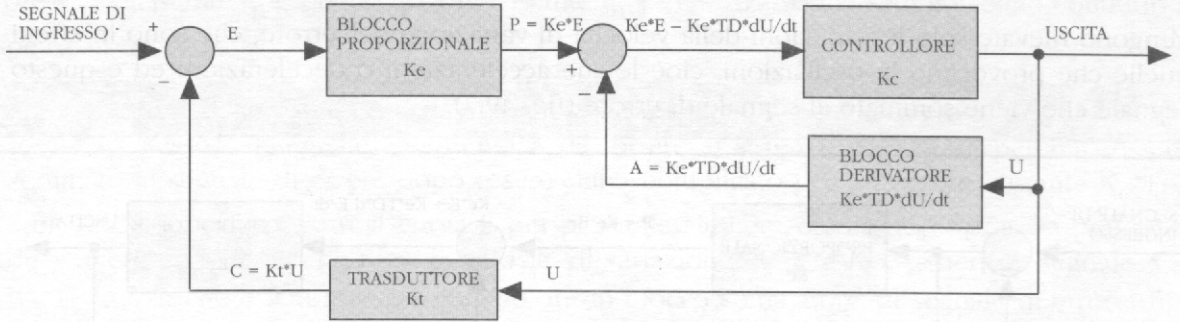
47.7

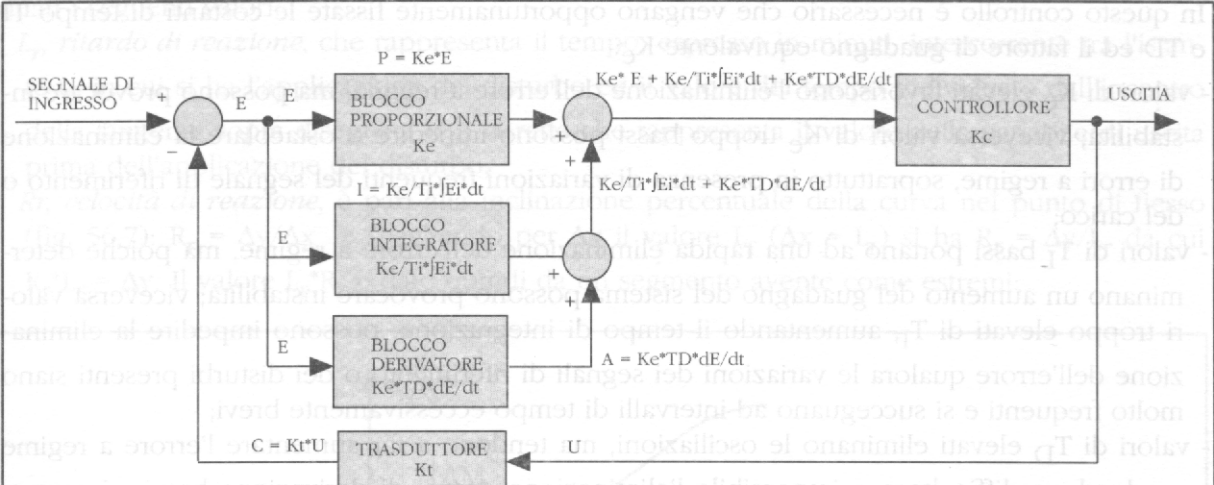

SEGNALE DI INGRESSO
+
−
E
E
BLOCCO PROPORZIONALE
Ke
P = Ke*E
Ke*E + Ke*TD*dE/dt
+
+
CONTROLLORE
Kc
USCITA
E
BLOCCO DERIVATORE
Ke*TD*dE/dt
A = Ke*TD*dE/dt
C = Kt*U
TRASDUTTORE
Kt
U

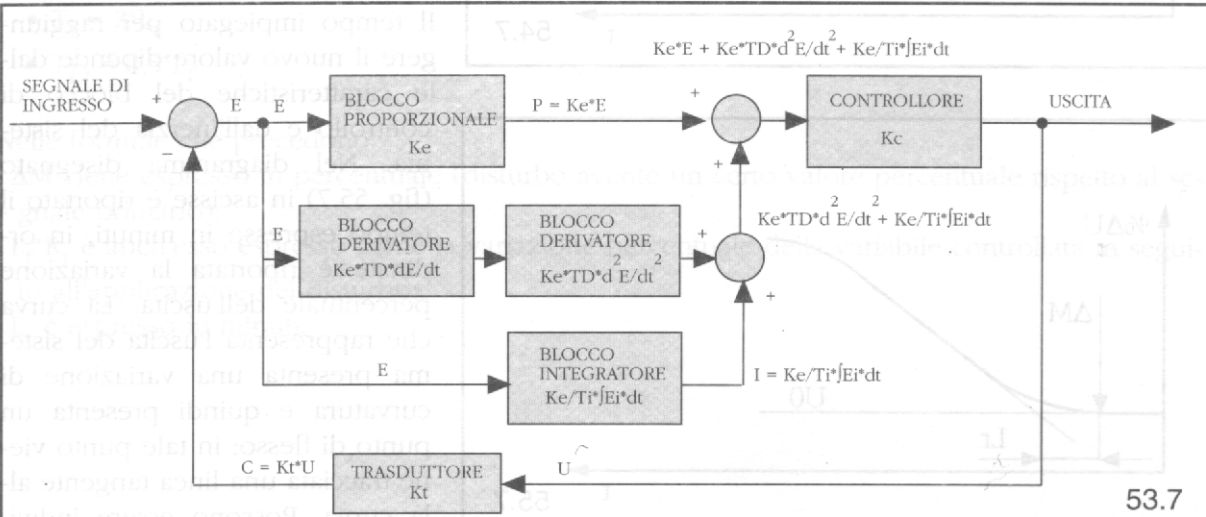

SEGNALE DI INGRESSO
+
−
E
E
BLOCCO PROPORZIONALE
Ke
P = Ke*E
Ke*E + Ke*TD*d 2 E/dt 2
+
+
CONTROLLORE
Kc
USCITA
E
BLOCCO DERIVATORE
Ke*TD*dE/dt
BLOCCO DERIVATORE
Ke*TD*d 2 E/dt 2
A = Ke*TD*d 2 E/dt 2
C = Kt*U
TRASDUTTORE
Kt
U

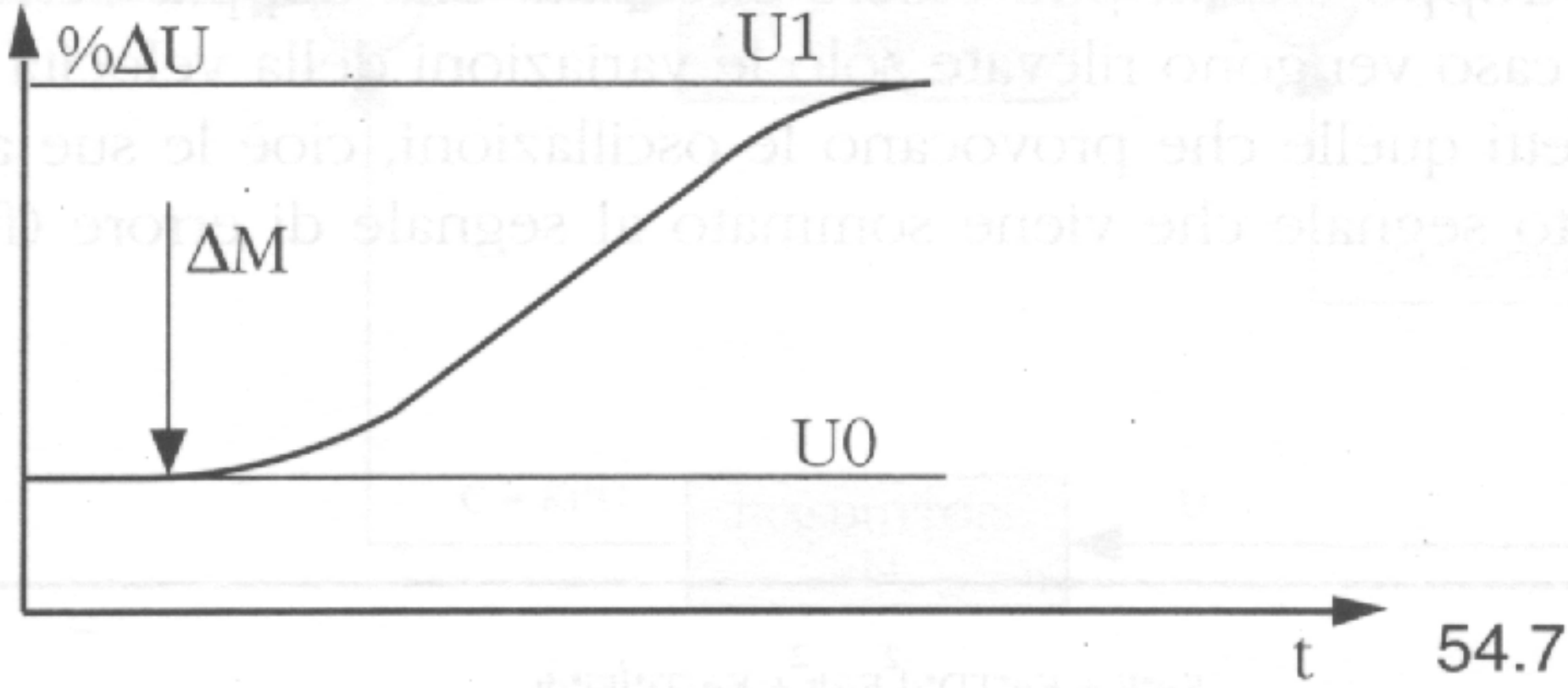


50.7

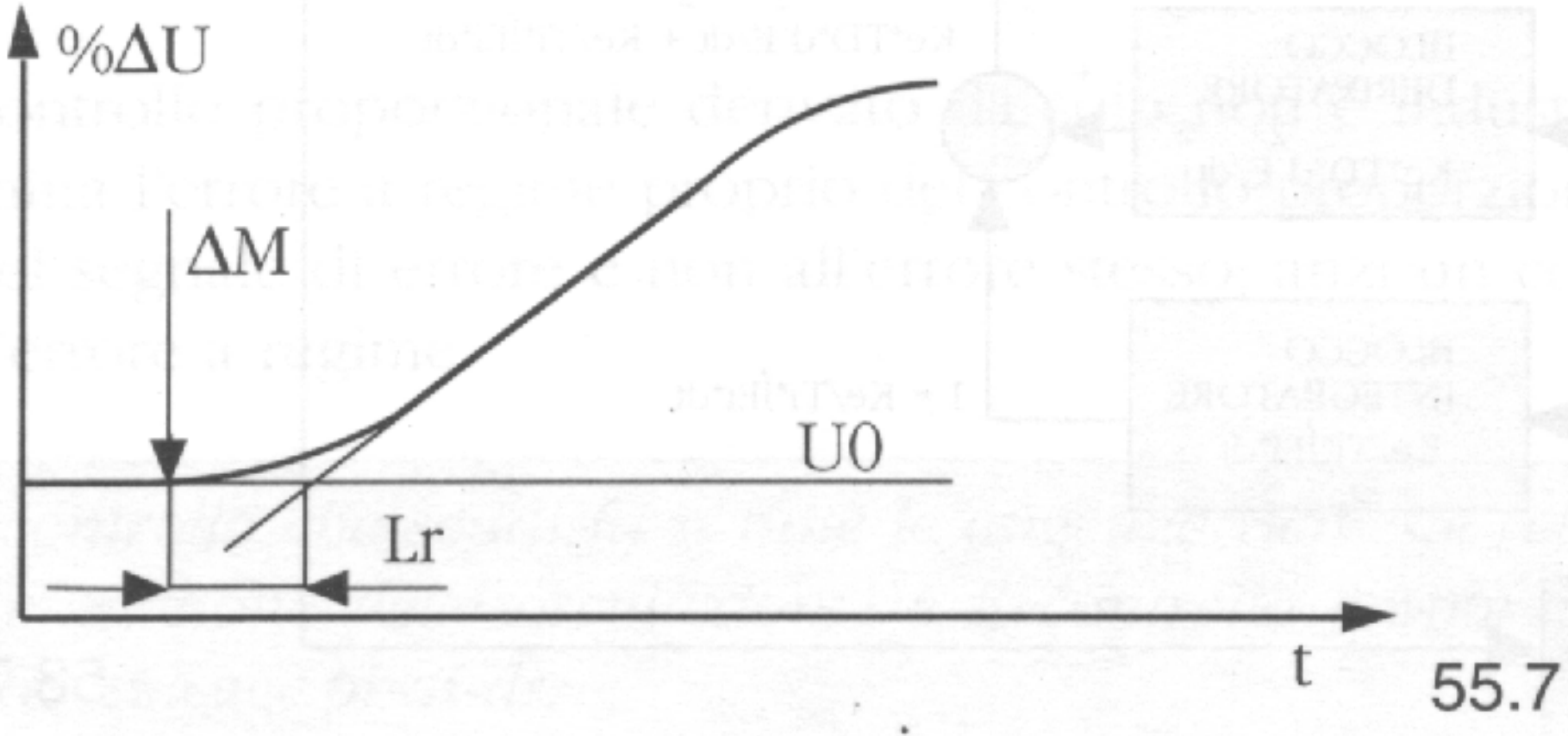

SEGNALE DI INGRESSO
+
−
E
BLOCCO PROPORZIONALE
Ke
P = Ke*E
Ke*E − Ke*TD*dU/dt
+
−
CONTROLLORE
Kc
USCITA
A = Ke*TD*dU/dt
BLOCCO DERIVATORE
Ke*TD*dU/dt
U
C = Kt*U
TRASDUTTORE
Kt
U


SEGNALE DI INGRESSO
+
−
E
E
P = Ke*E
BLOCCO PROPORZIONALE
Ke
Ke* E + Ke/Ti*∫Ei*dt + Ke*TD*dE/dt
+
+
CONTROLLORE
Kc
USCITA
I = Ke/Ti*∫Ei*dt
Ke/Ti*∫Ei*dt + Ke*TD*dE/dt
E
BLOCCO INTEGRATORE
Ke/Ti*∫Ei*dt
+
+
E
BLOCCO DERIVATORE
Ke*TD*dE/dt
A = Ke*TD*dE/dt
C = Kt*U
TRASDUTTORE
Kt
U

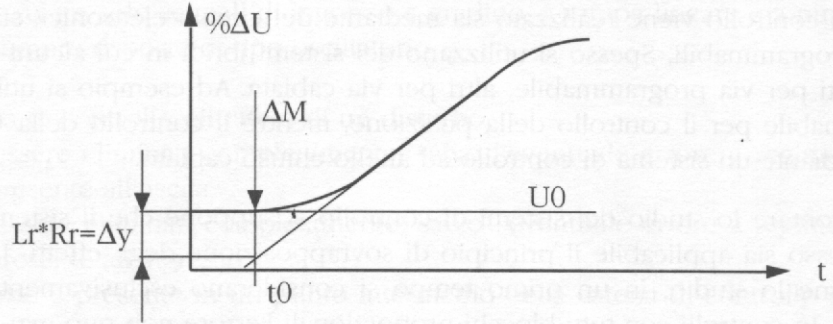

Ke*E + Ke*TD*d²E/dt² + Ke/Ti*∫Ei*dt
SEGNALE DI INGRESSO
+
−
E
E
BLOCCO PROPORZIONALE Ke
P = Ke*E
+
+
CONTROLLORE Kc
USCITA
E
BLOCCO DERIVATORE Ke*TD*dE/dt
BLOCCO DERIVATORE Ke*TD*d²E/dt²
Ke*TD*d²E/dt² + Ke/Ti*∫Ei*dt
+
+
E
BLOCCO INTEGRATORE Ke/Ti*∫Ei*dt
I = Ke/Ti*∫Ei*dt
C = Kt*U
TRASDUTTORE Kt
U



54.7



55.7


%ΔU
ΔM
U0
Lr*Rr=Δy
t
t0