

Pål Davidsen, UiB:
Systemdynamikk;
modellering, simulering og analyse i samfunnsfag.
- Historikk, prinsipper og verktøy

Gruppen for Systemdynamikk

Institutt for Geografi
(1995 -)



Erling Moxnes



Pål I. Davidsen



I. David Wheat

Systemdynamikk

tidlig historie

Gordon S. Brown 1907 – 1996

Head of the Servomechanics Lab, MIT, 1939-1952

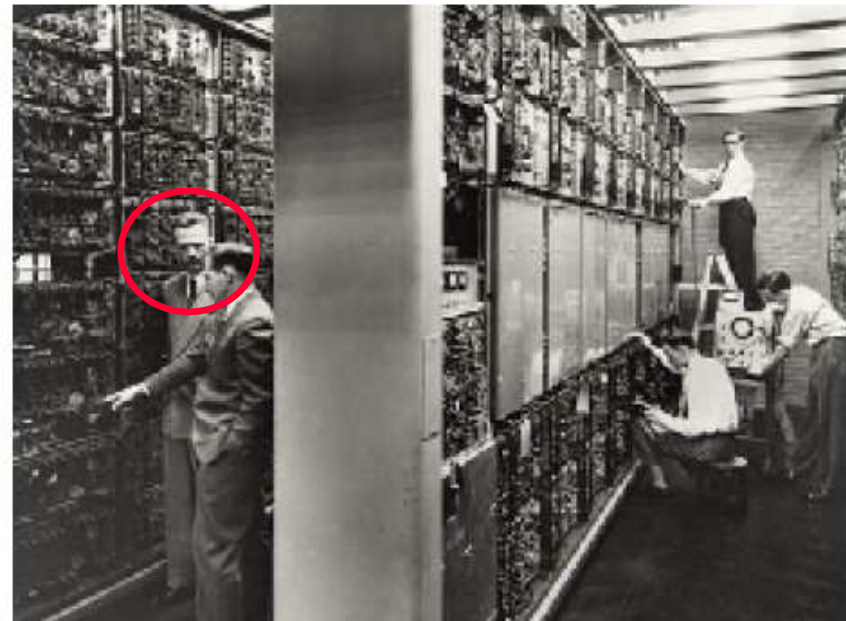
The Cinema Intergraph, 1938

Principles of Servomechanisms, 1948

Chairman of the electrical engineering department, 1952 – 68

Dean of School of Engineering, 1959 - 68

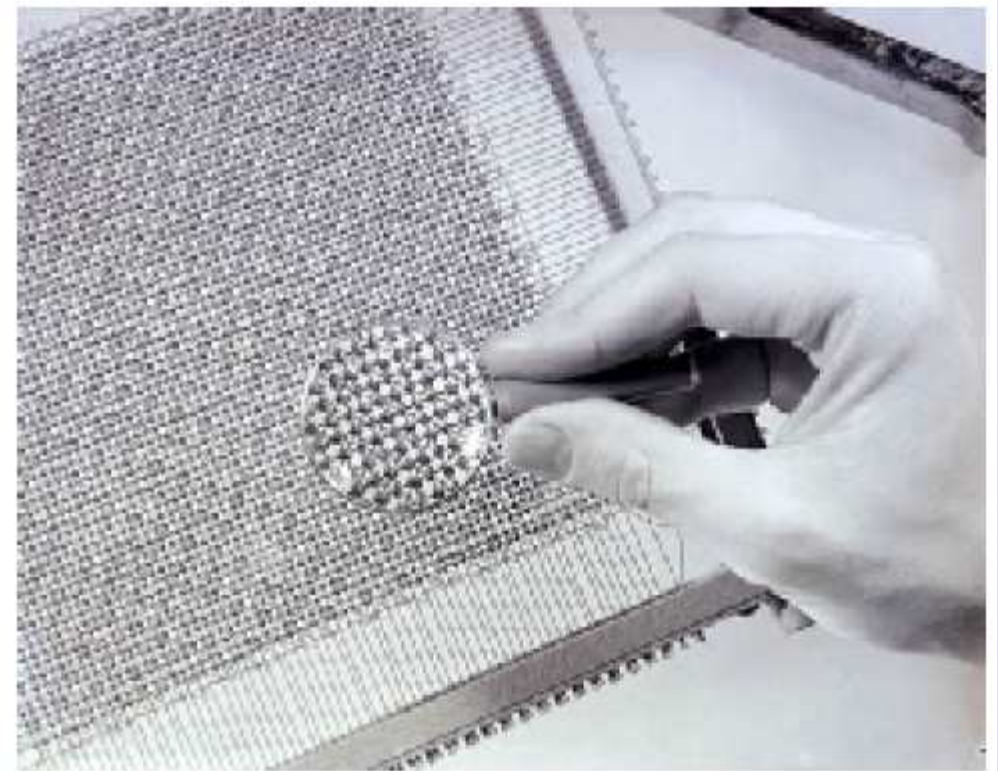
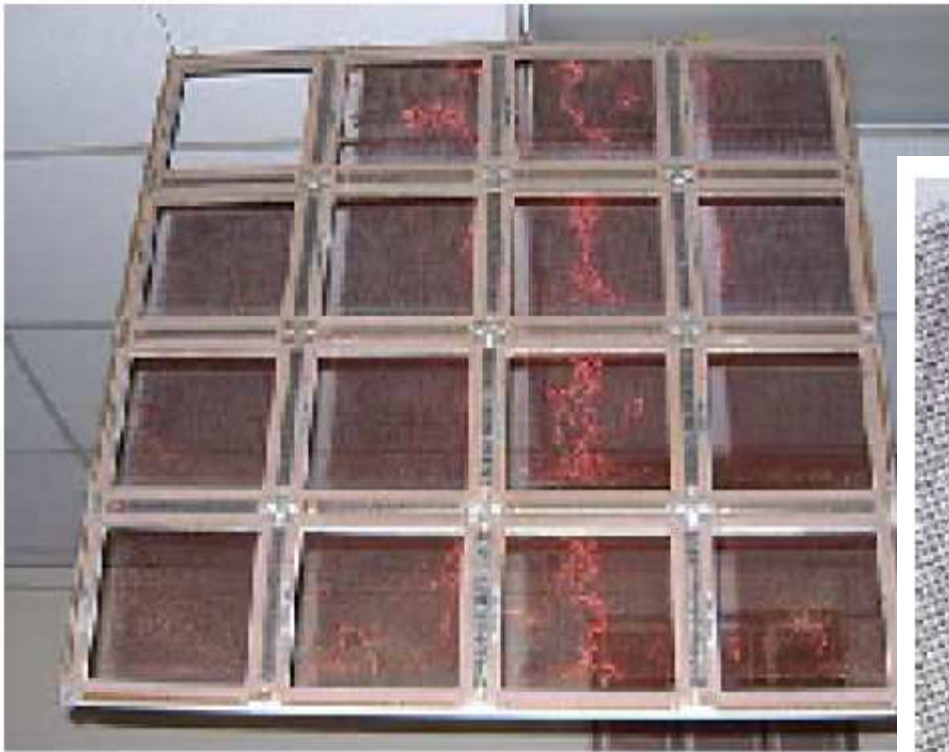
Worldwind, 1939 - 1952





Jay W. Forrester

Magnetic Core Memory





Systemdynamikk

Jay W. Forrester

Jay W. Forrester 1918 – ...

Worldwind Project, MIT, 1939-1952

USAF SemiAutomatic Ground Environment (SAGE), 1954 - 56



Systemdynamikk

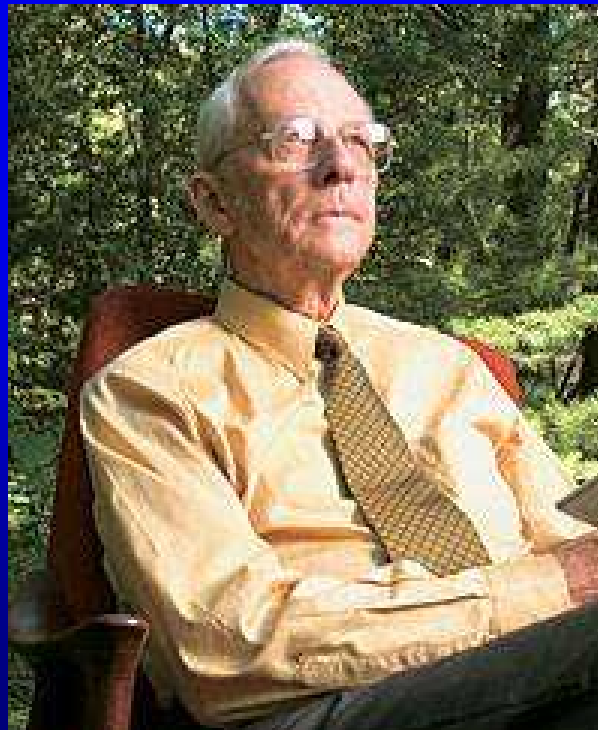
Jay W. Forrester

Gehermeshausen Professor, Sloan School, 1956

Industrial Dynamics, MIT, 1961

Urban Dynamics, MIT, 1969

World Dynamics, MIT, 1971



Systemdynamikk

Jay W. Forrester



IEEE Computer Pioneer Award, 1982

National Medal of Technology 1989

Operational Research Hall of Fame, 2006

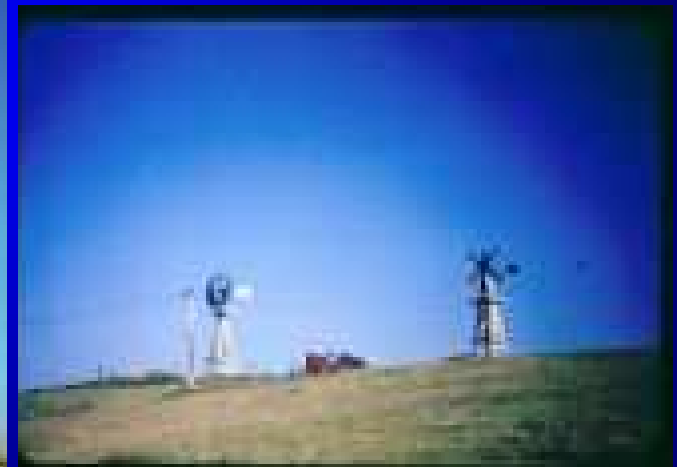


Systemdynamikk

Jay W. Forrester



The Prophet of Unintended Consequences



Systemdynamikk

Jay W. Forrester



Peter Senge



Dennis Meadows



John D. Sterman



John D. Morecroft



Jac Vennix



David Andersen



George P. Richardson



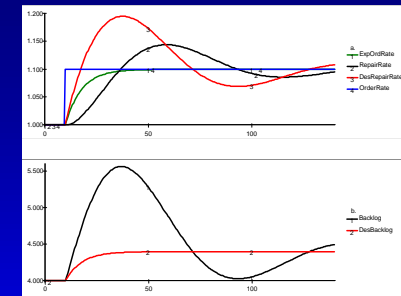
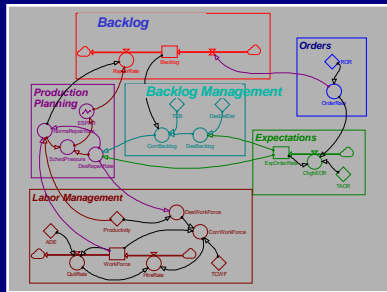
Michael Radzicki



David Lane



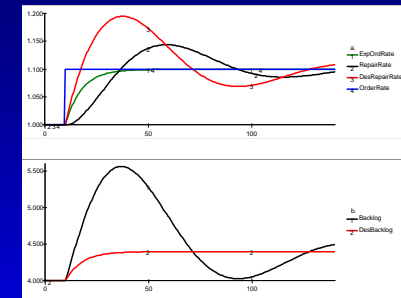
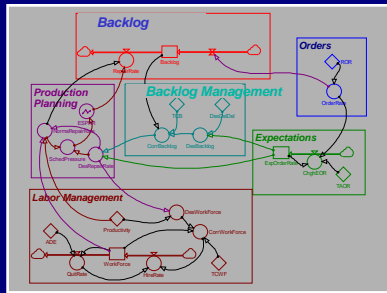
Kim Warren



Systemdynamikk

Vitenskapelig metode for studiet av komplekse, dynamiske systemer vha. modellering og simulering.

Kunnskaps- tapping



Systemdynamikk

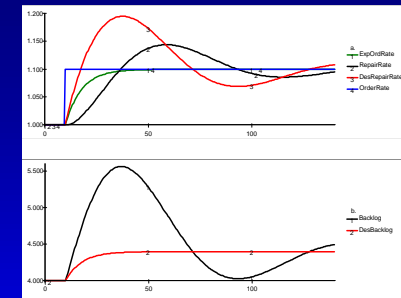
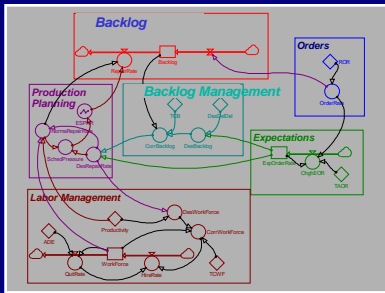
Problem
identifisering

Problem
løsing

Ledelse

Kunnskaps-
formidling

Nasjonal utviklingsplanlegging (GIS)



Systemdynamikk

Virksomhets-
planlegging

Organisasjons-
læring

Medisin

Pedagogikk

Jus

Dynamikk

Struktur



Dynamikk
Struktur



Dynamikk
Struktur

The diagram features two yellow curved arrows. One arrow starts on the left side of the word 'Dynamikk' and curves upwards and to the right, pointing towards the word. The other arrow starts on the right side of the word 'Struktur' and curves upwards and to the left, pointing towards the word. This visualizes a bidirectional relationship between the two concepts.

Systemdynamikk:

Identifisere, forstå, og utnytte
forholdet mellom:



komplekse, dynamiske systemer

Forsinkelser

Feedback

Kompleksitet

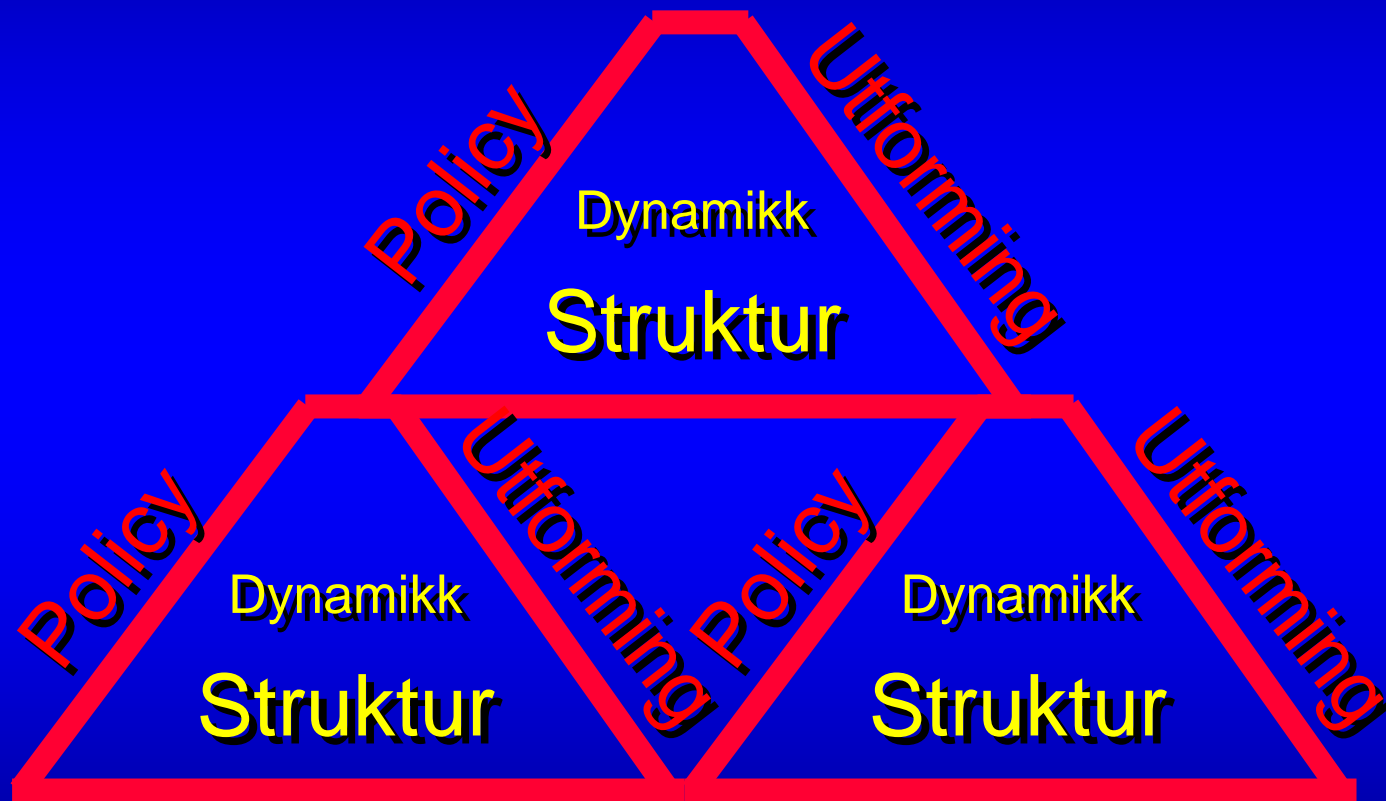
Ulineariteter

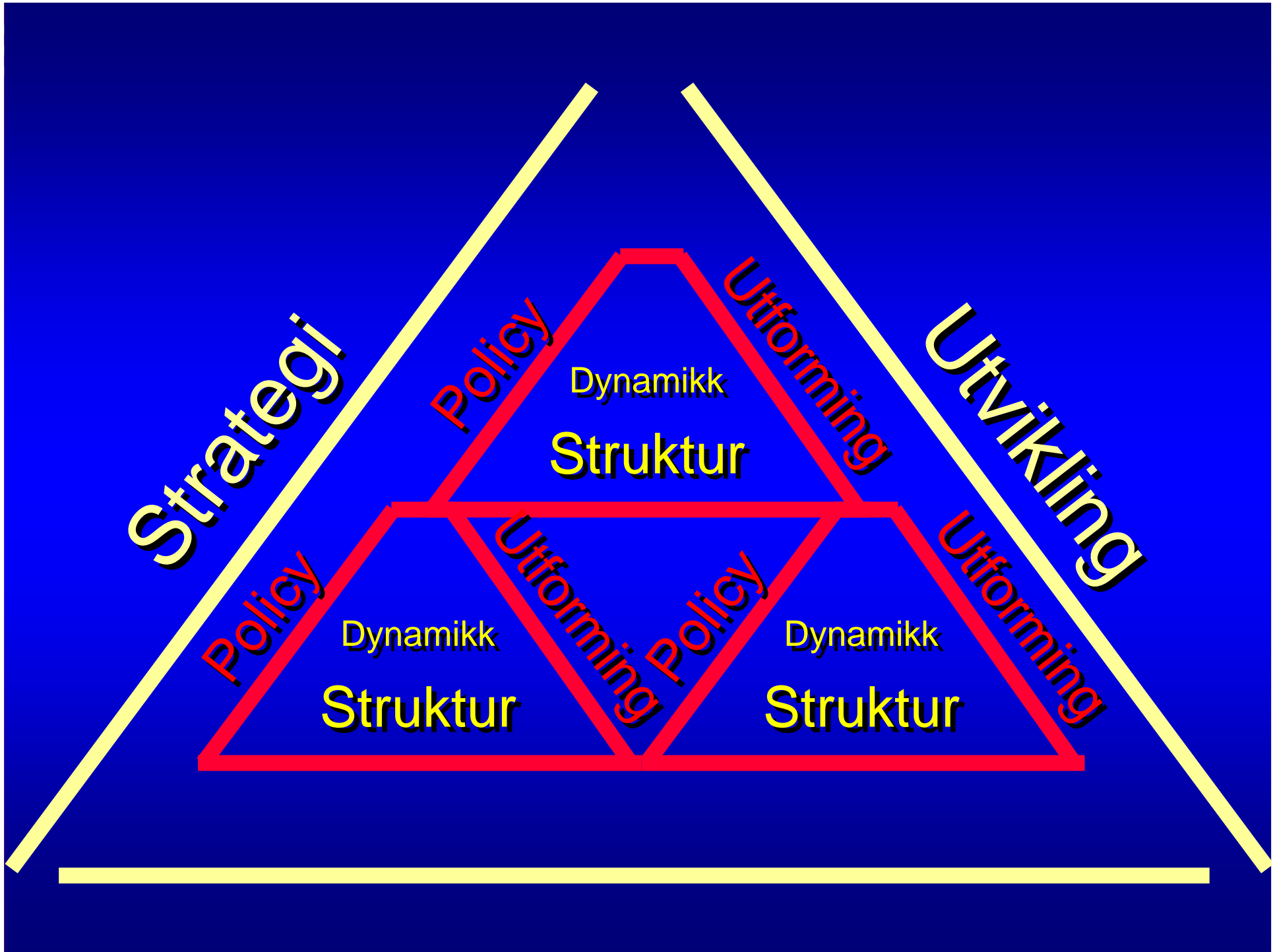
Policy

Dynamikk

Utforming

Struktur





Strategi



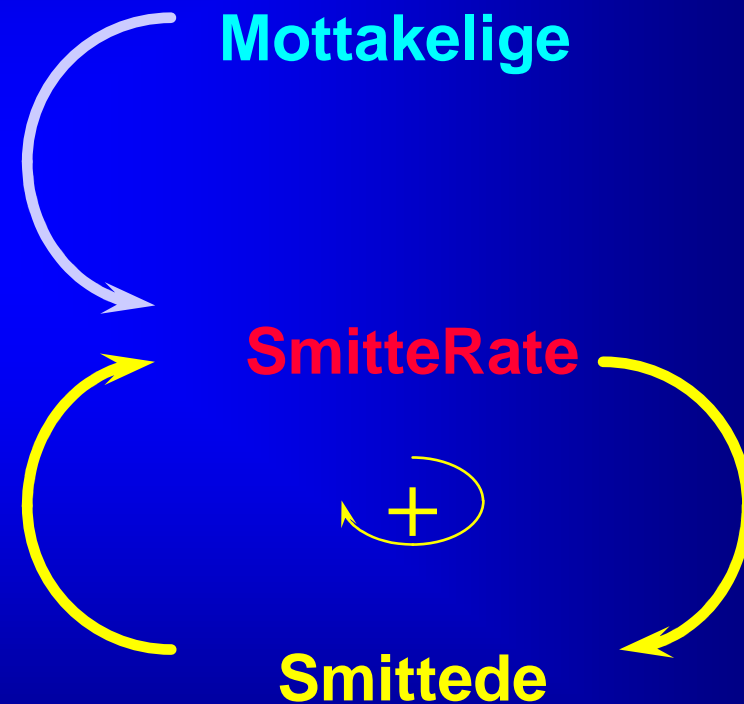
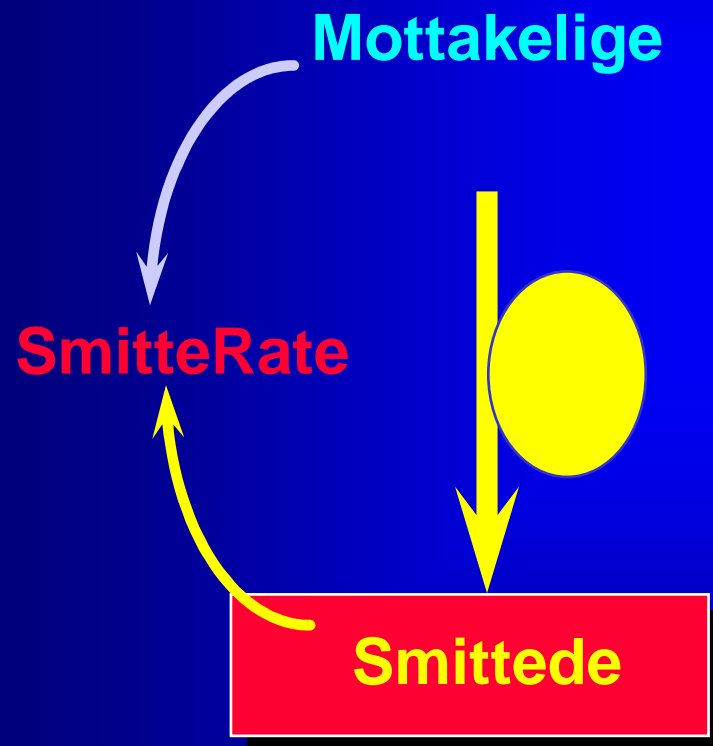
Utvikling

Systemdynamikk

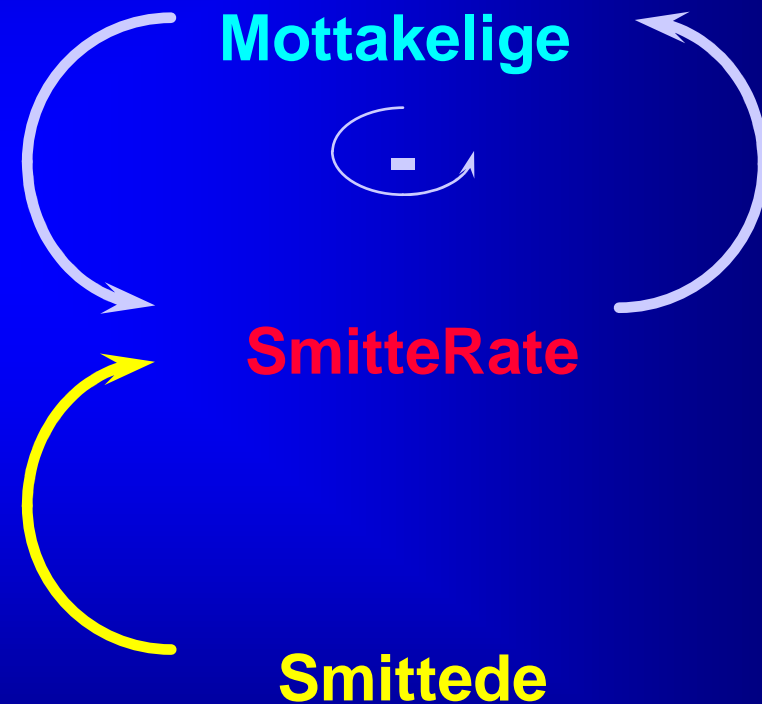
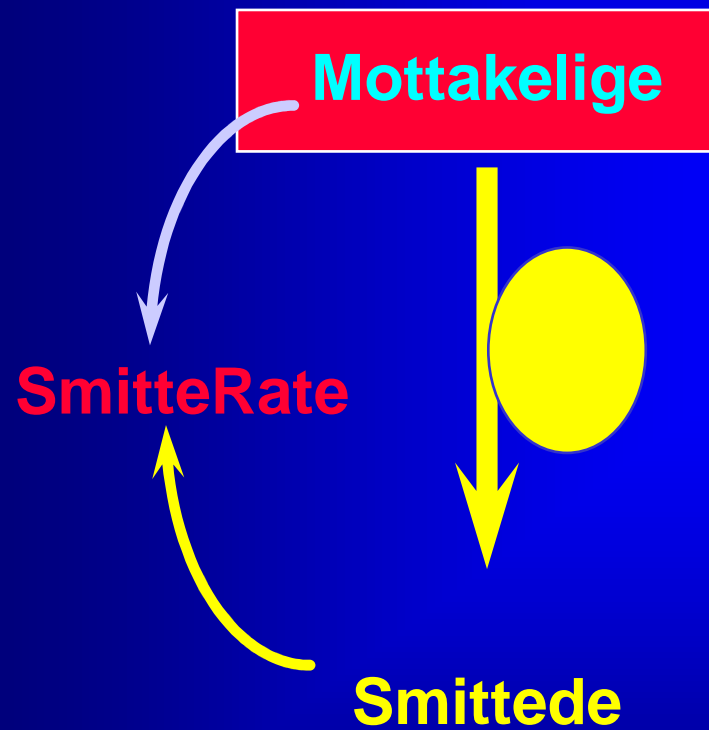
en

Flerfaglig tilnærming

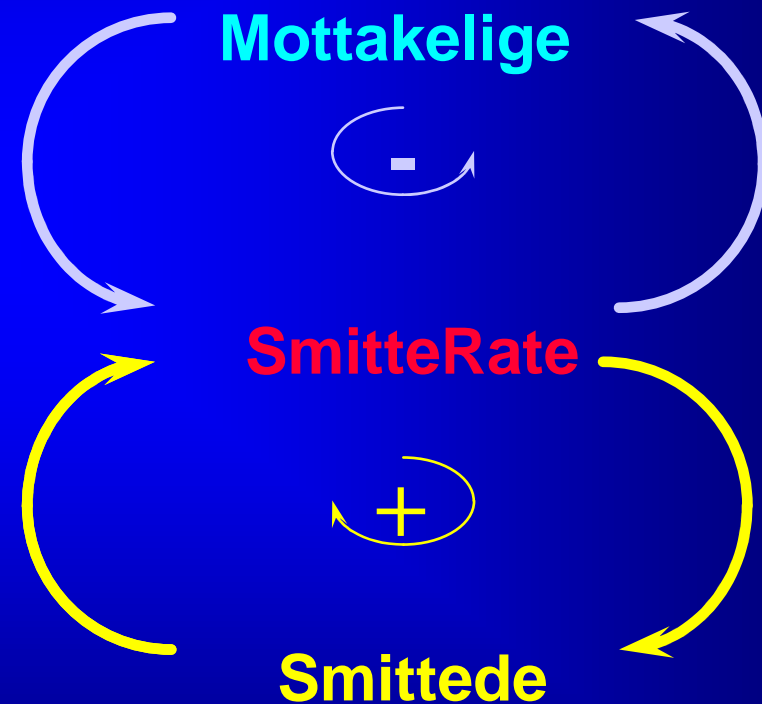
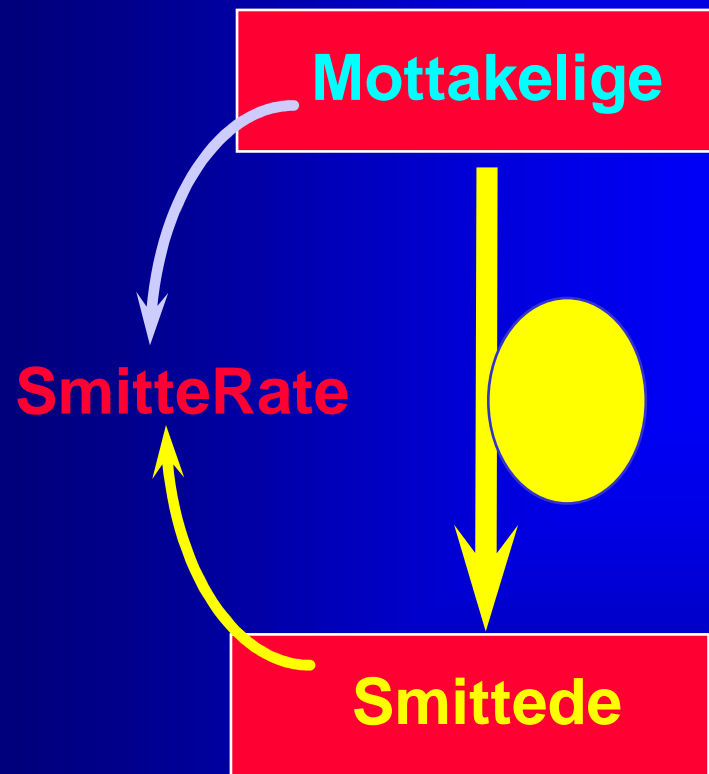
Positiv feedback dominans



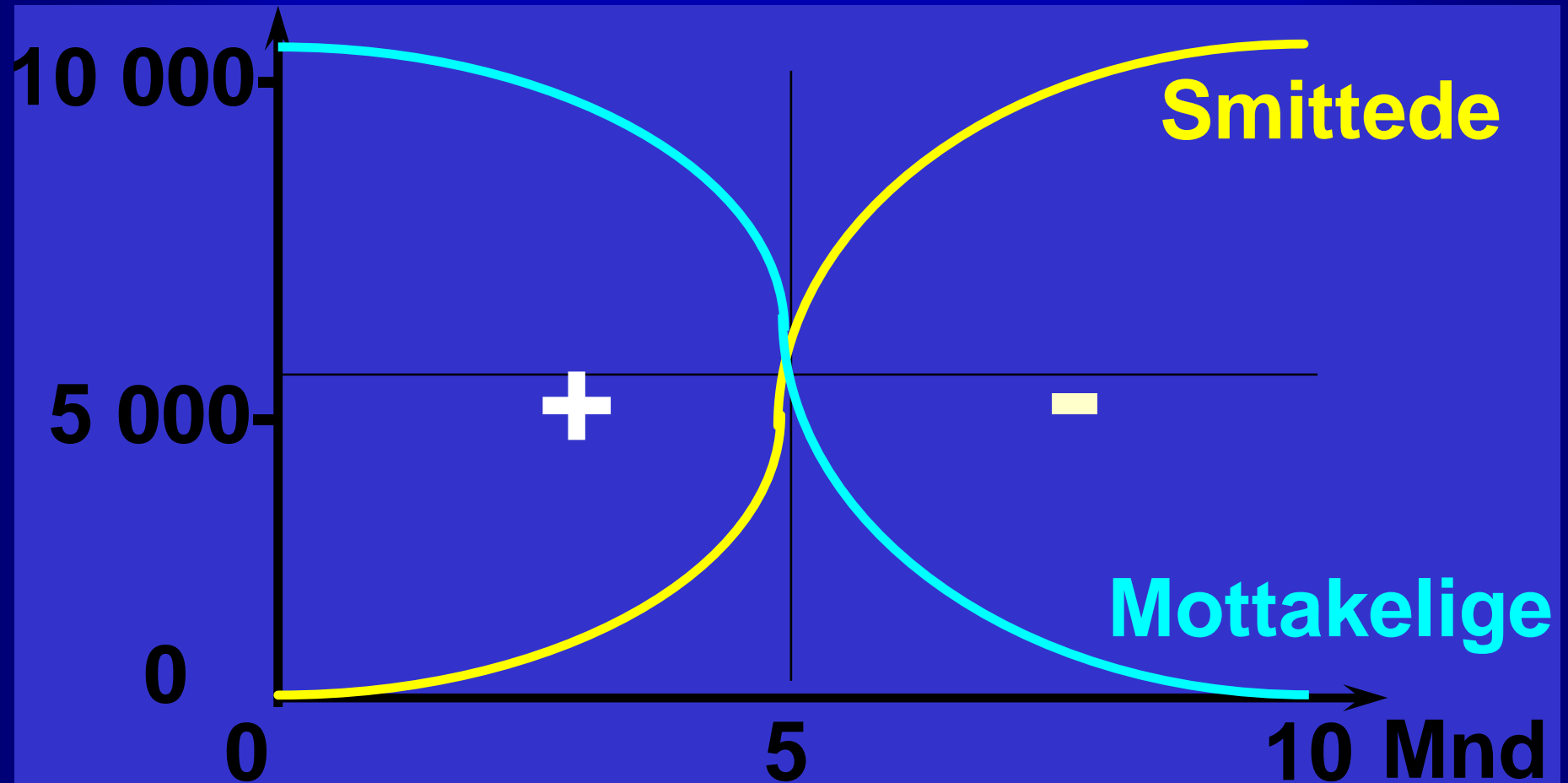
Negativ feedback dominans



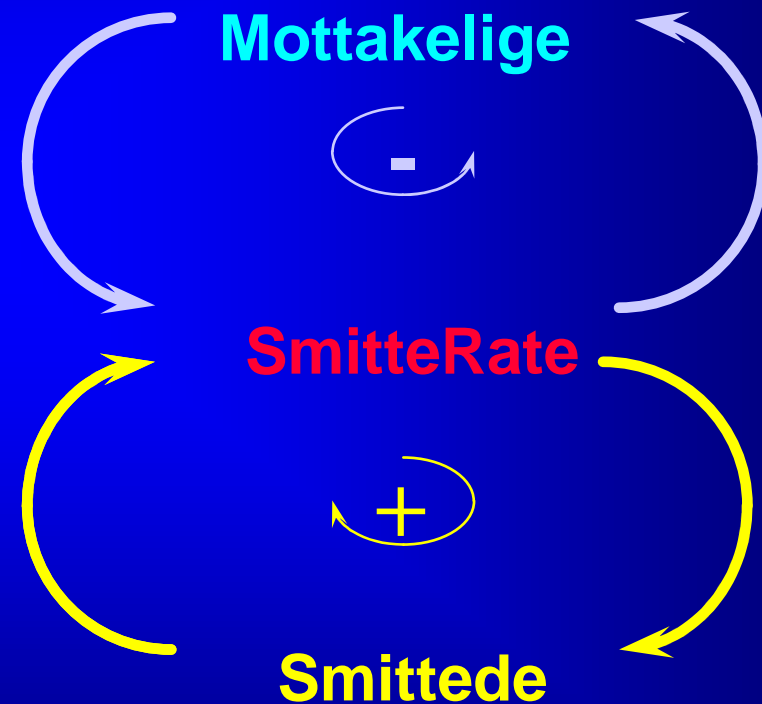
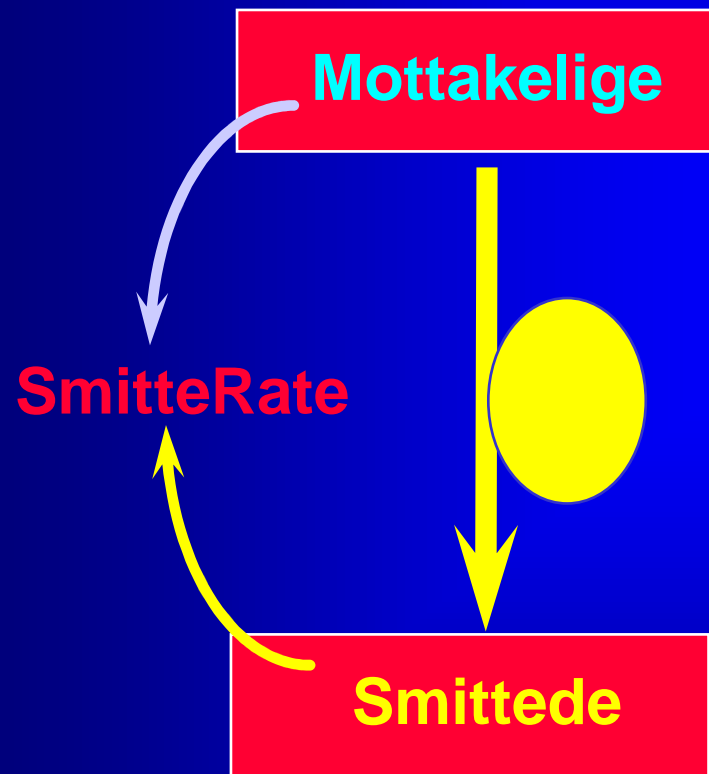
Skift i strukturell dominans



Skift i strukturell dominans

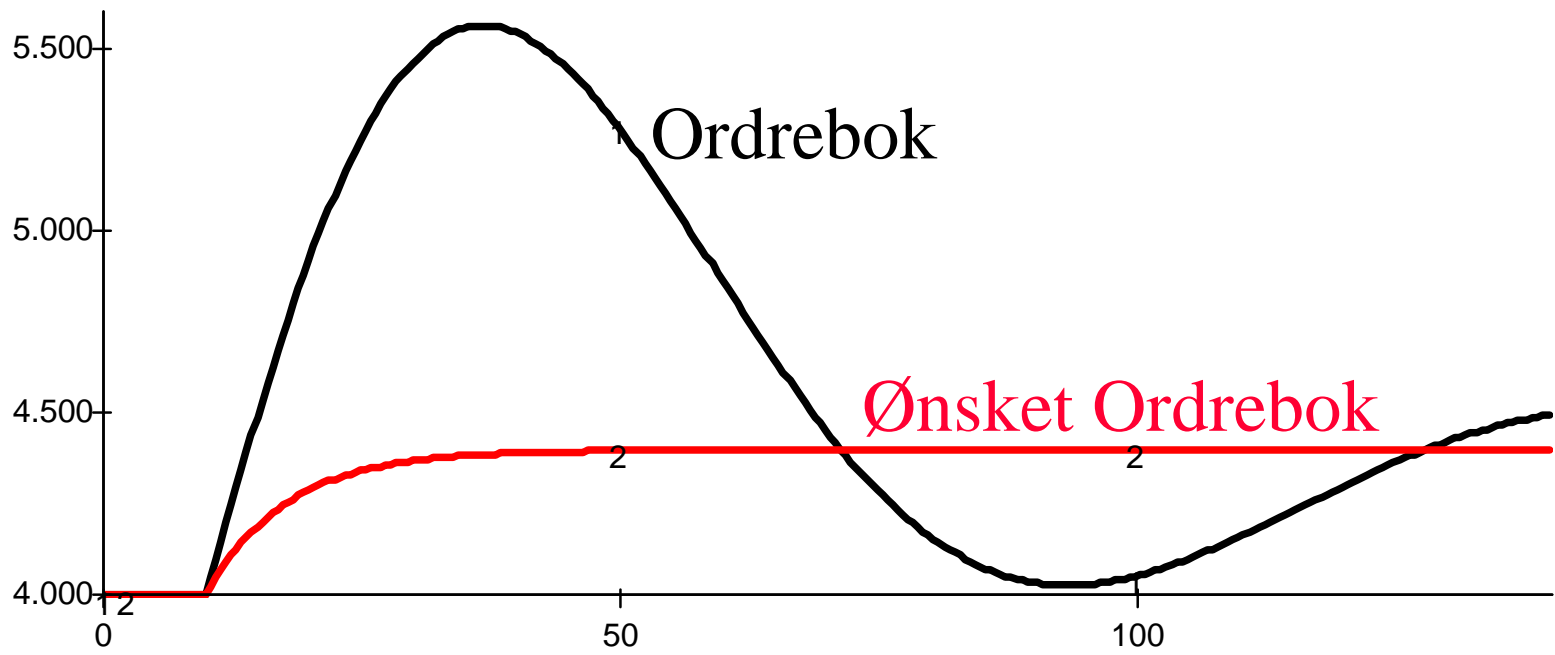
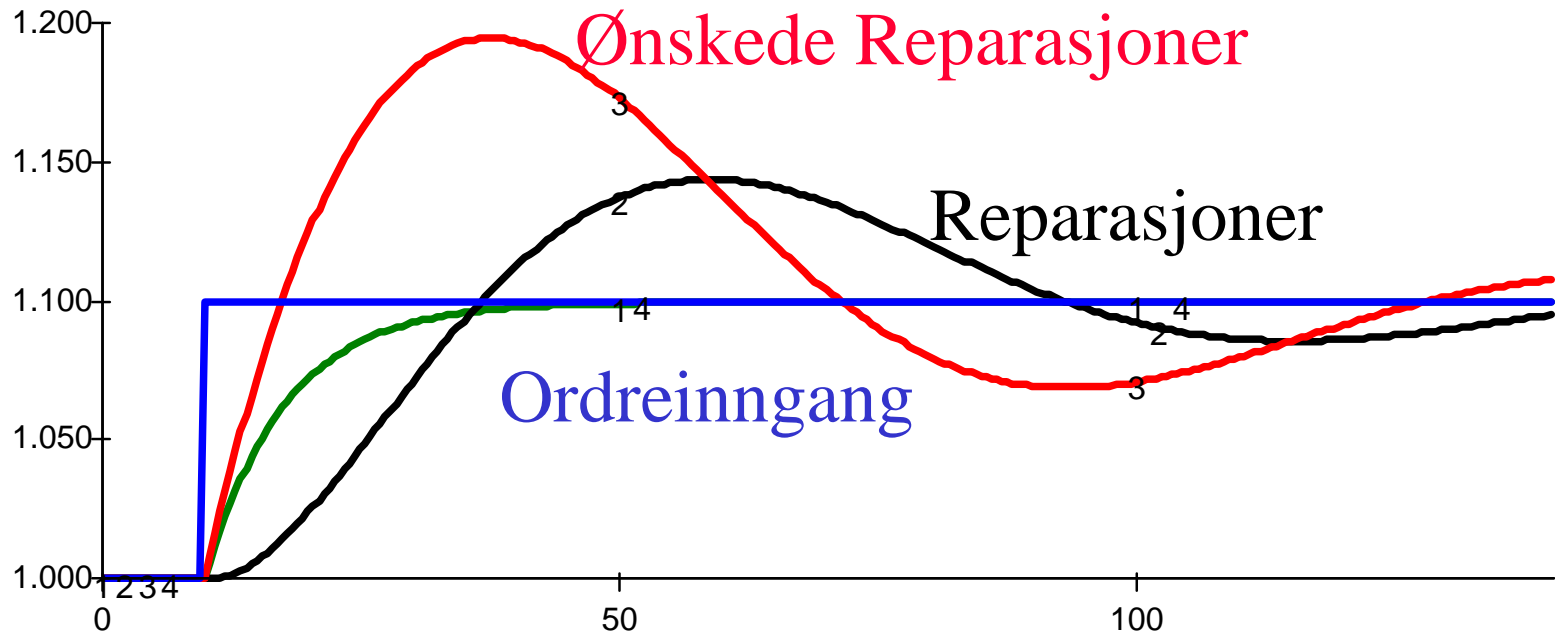


Skift i strukturell dominans

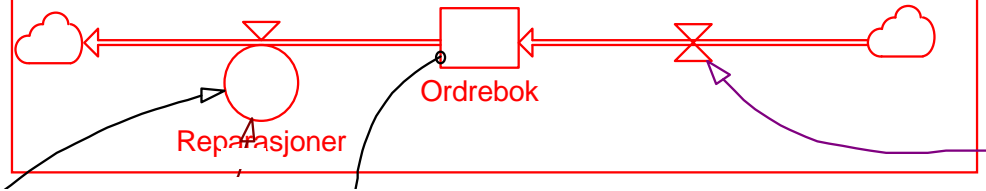


En Dynamisk Fortelling

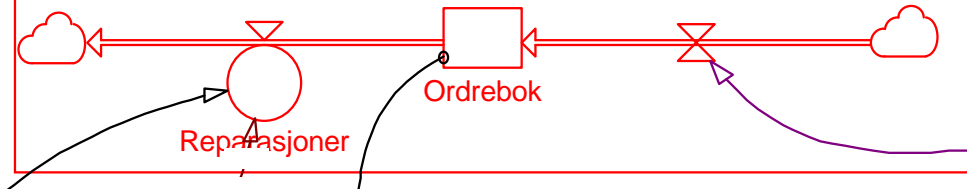
kunnskapsdistillering



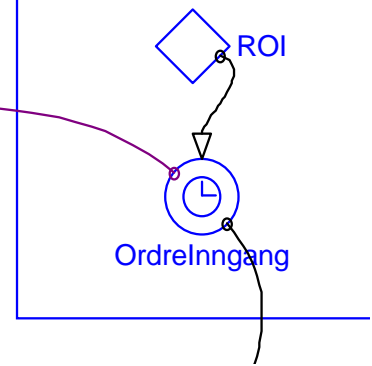
Backlog

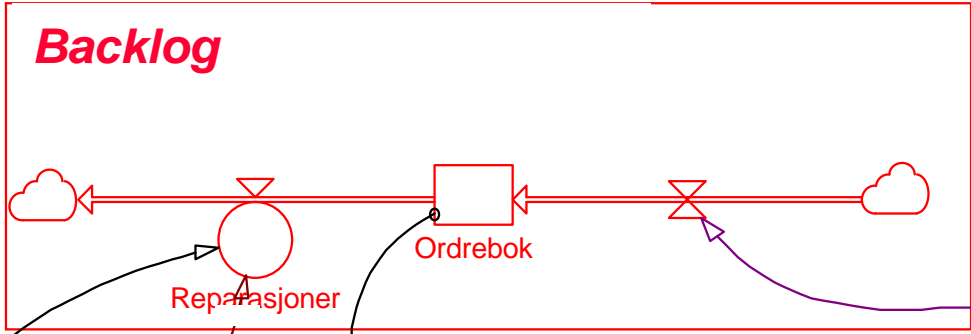


Backlog

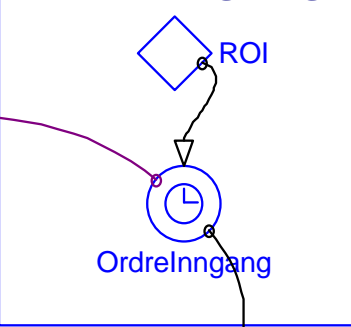


OrdreInngang

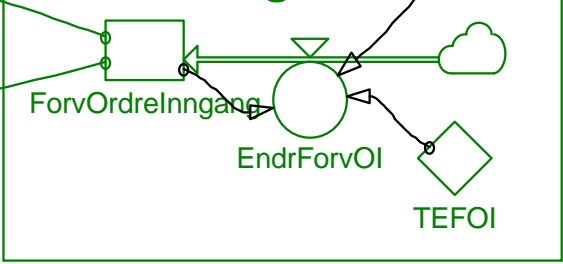




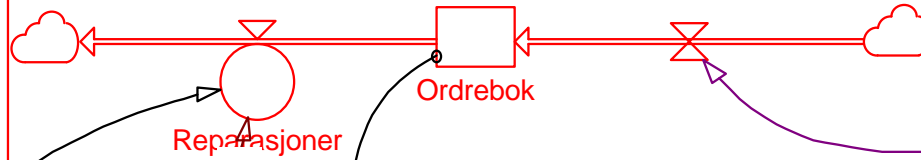
OrdreInngang



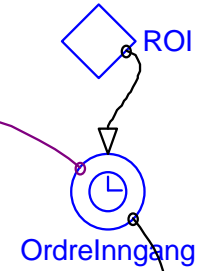
Forventninger



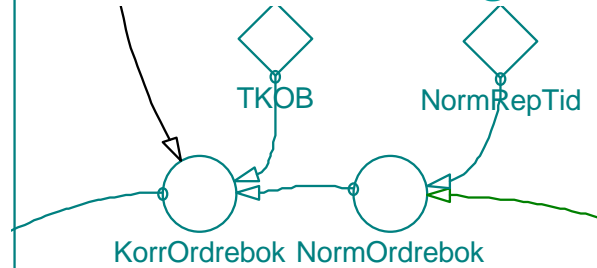
Backlog



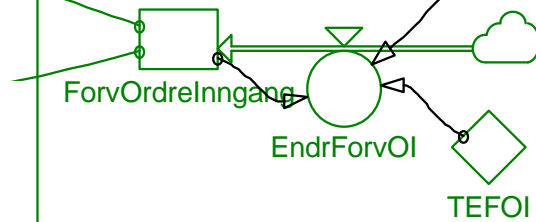
OrdreInngang



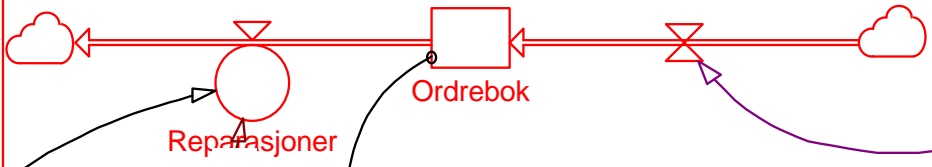
OrdrebokHåndtering



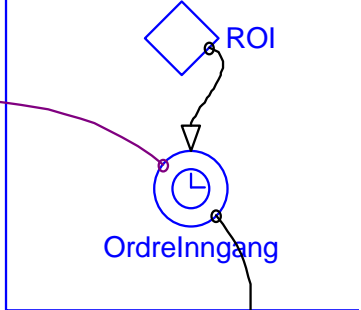
Forventninger



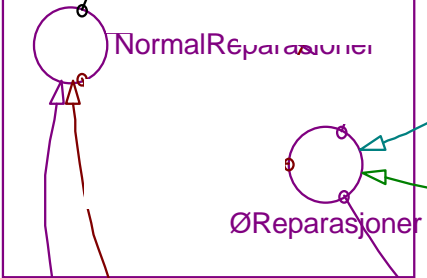
Backlog



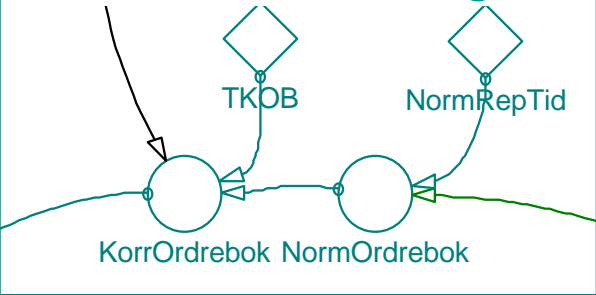
OrdreInngang



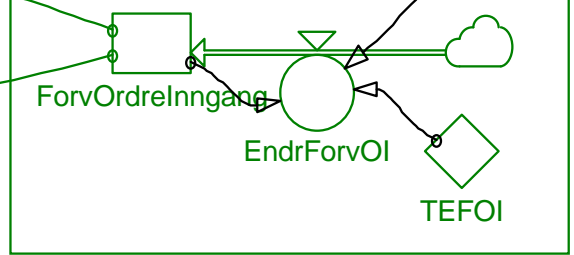
Produksjons Planlegg



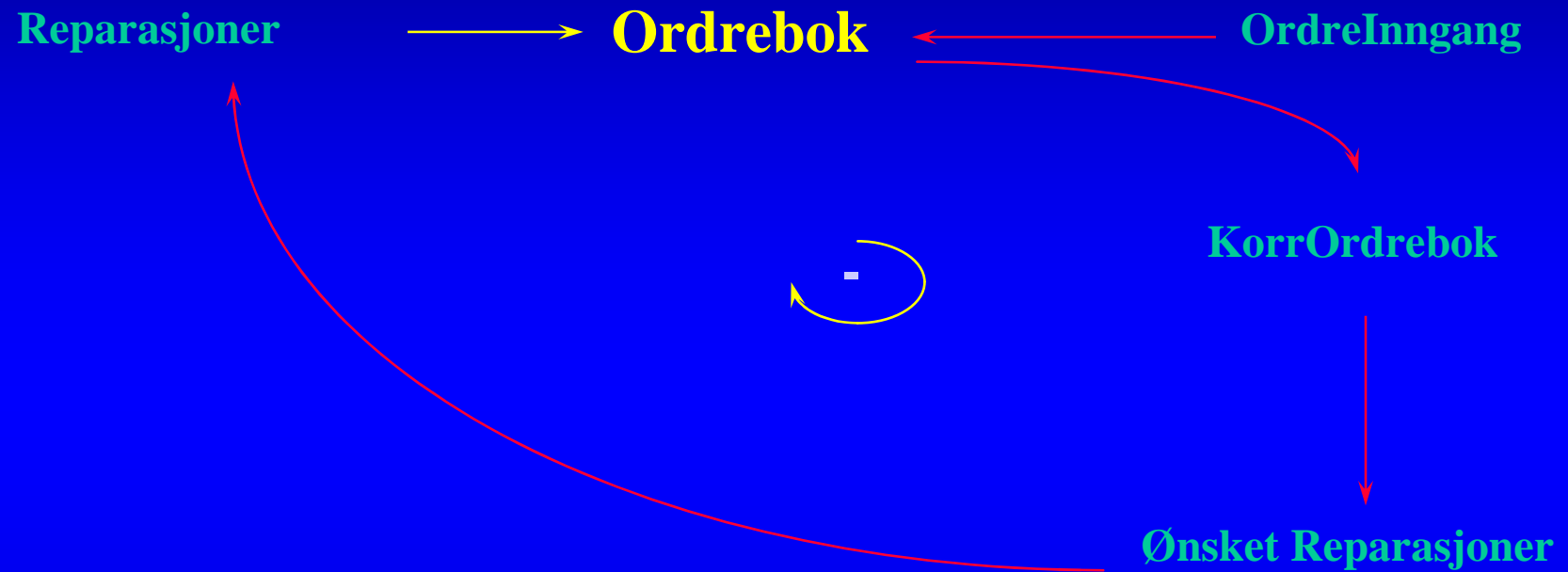
OrdrebokHåndtering



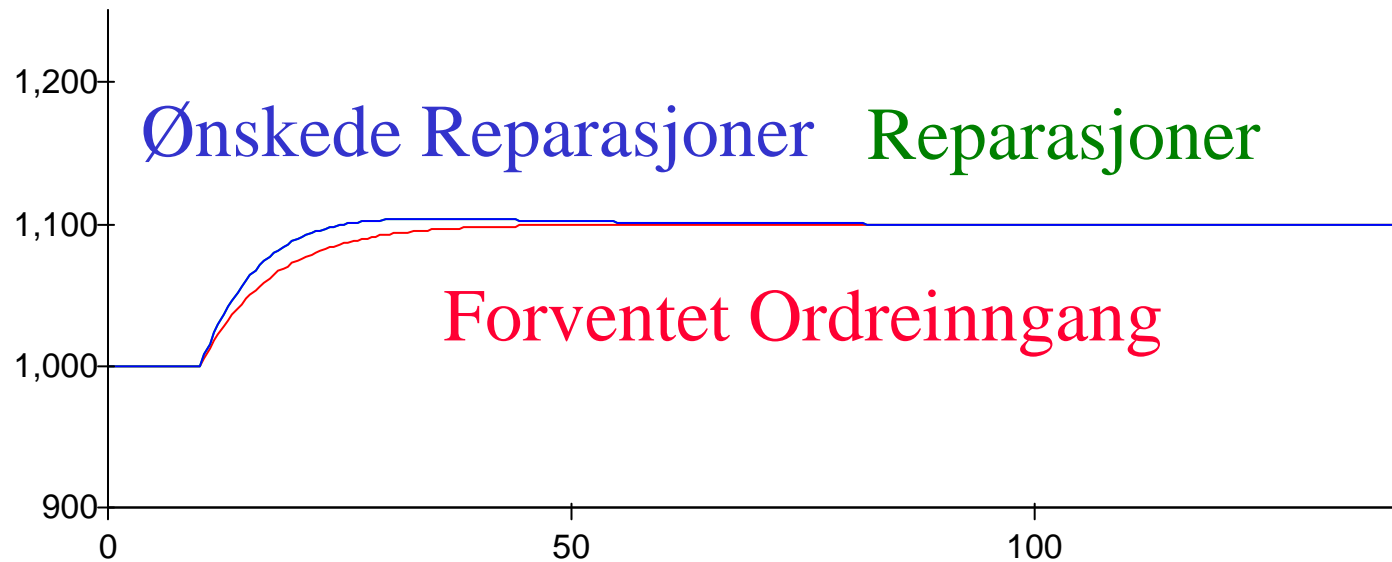
Forventninger



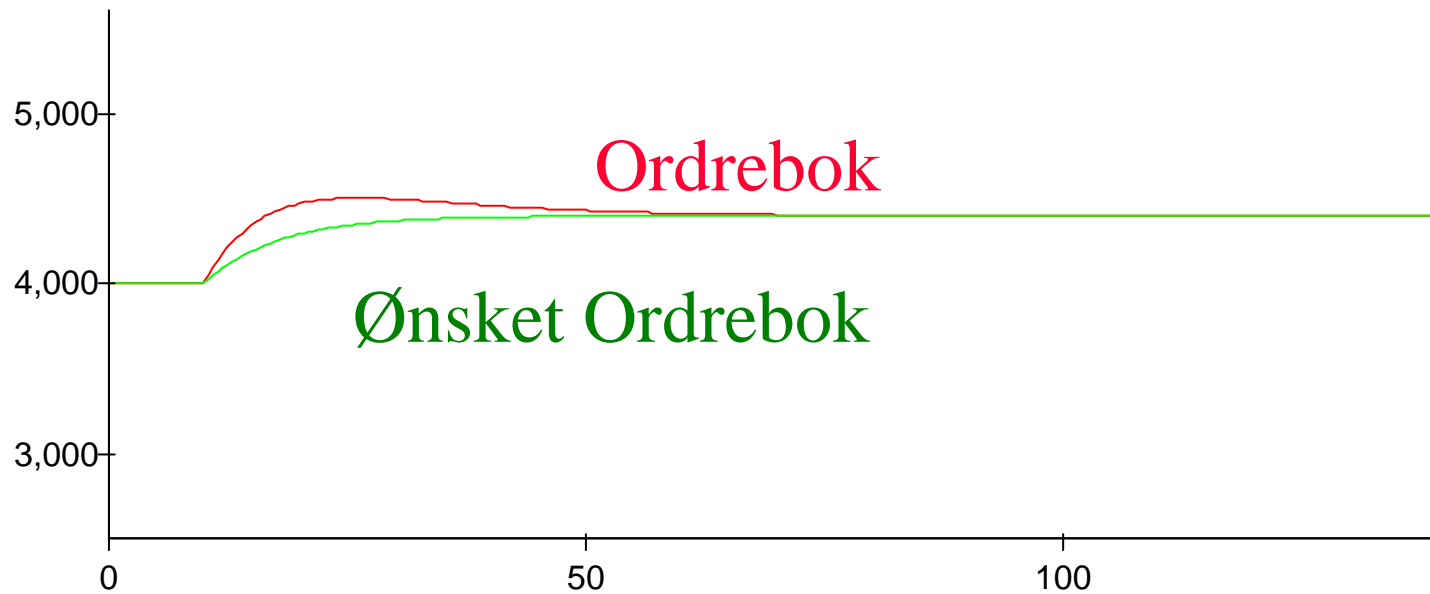
Ideal Struktur



Response of the Backlog model to a 10% step increase in orders in week 10

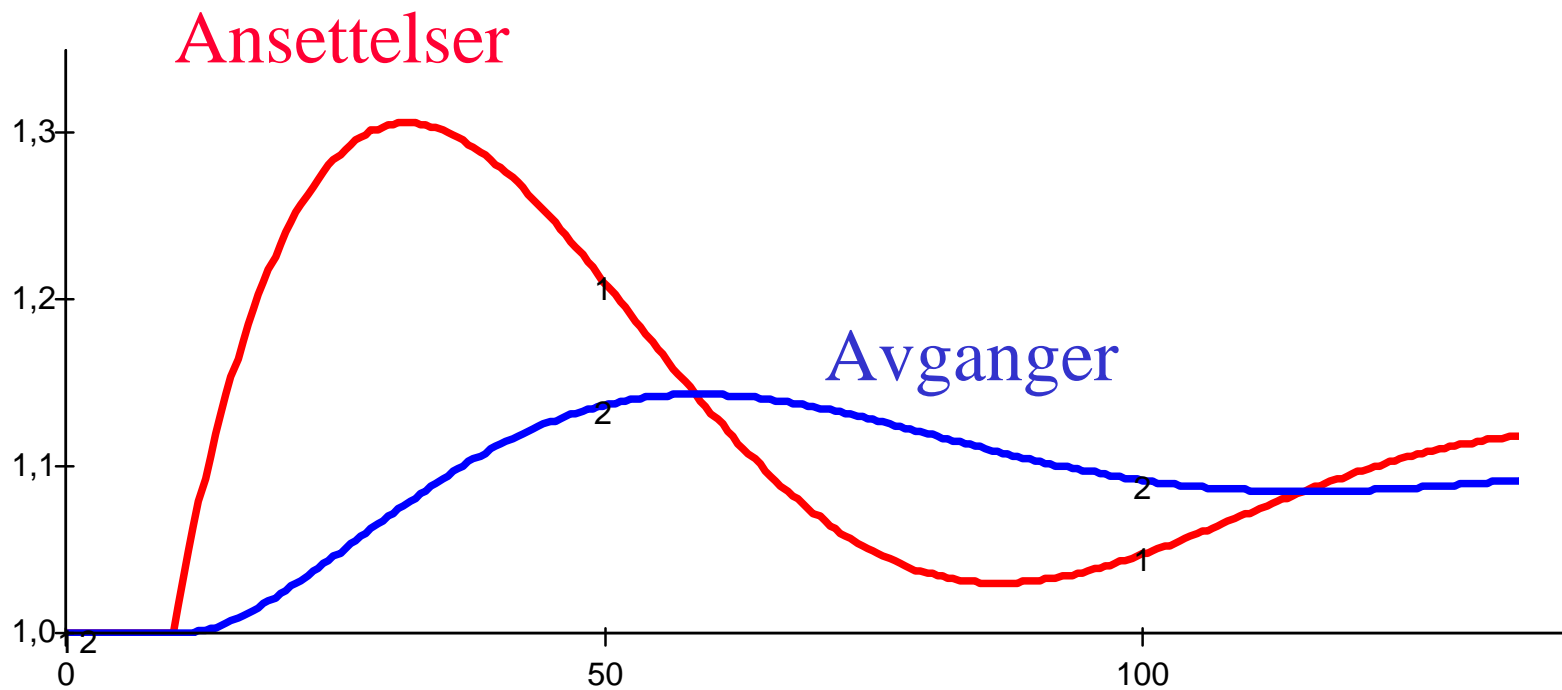
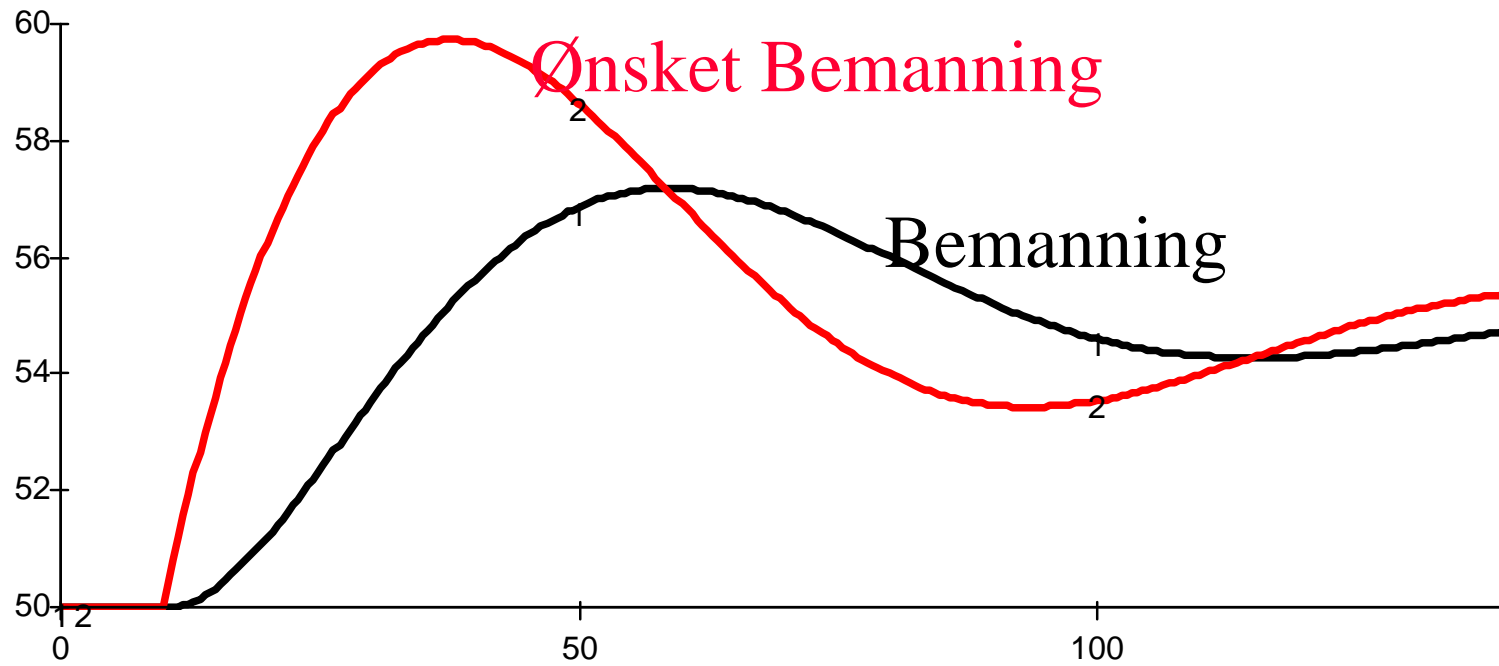


Response of the Backlog model to a 10% increase in orders in week 10

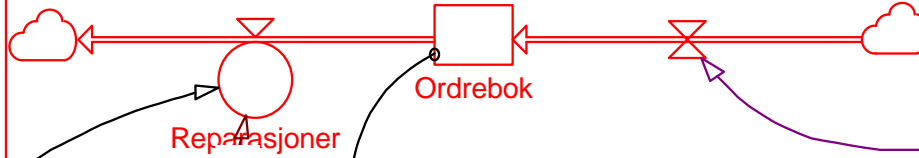


En Dynamisk Fortelling

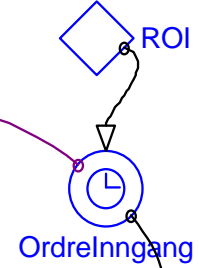
Ytterligere Informasjon



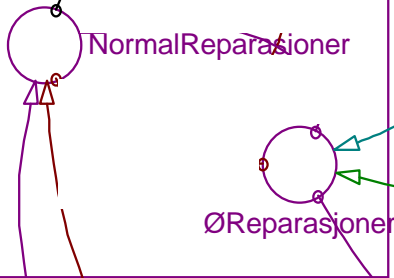
Backlog



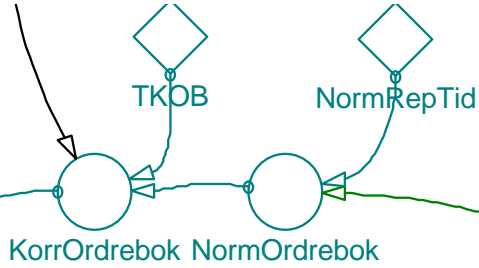
OrdreInngang



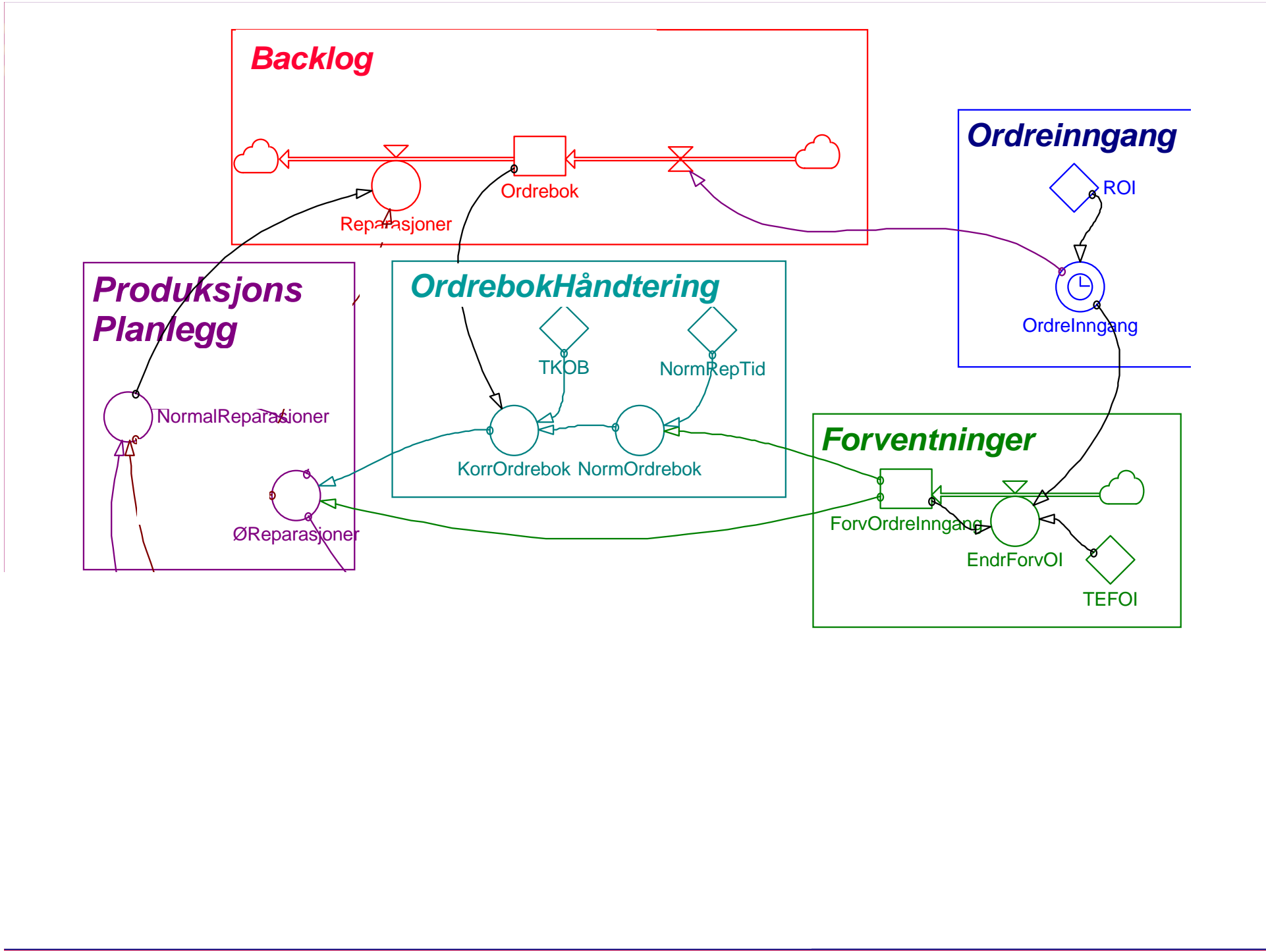
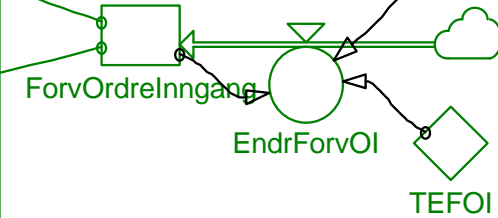
Produksjons Planlegg



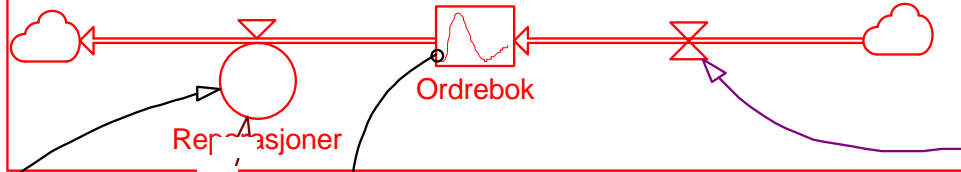
OrdrebokHåndtering



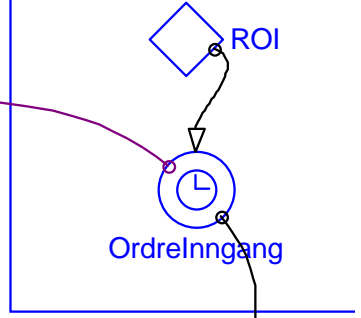
Forventninger



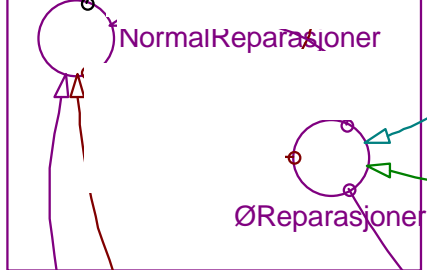
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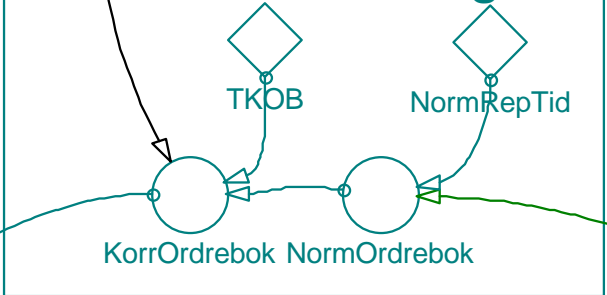
Ordreinngang



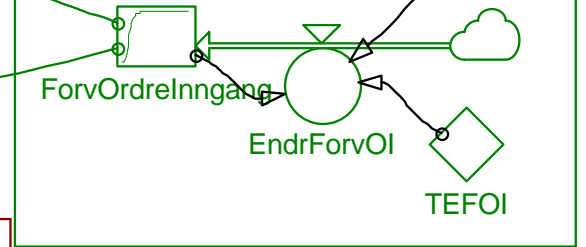
Produksjons Planlegg



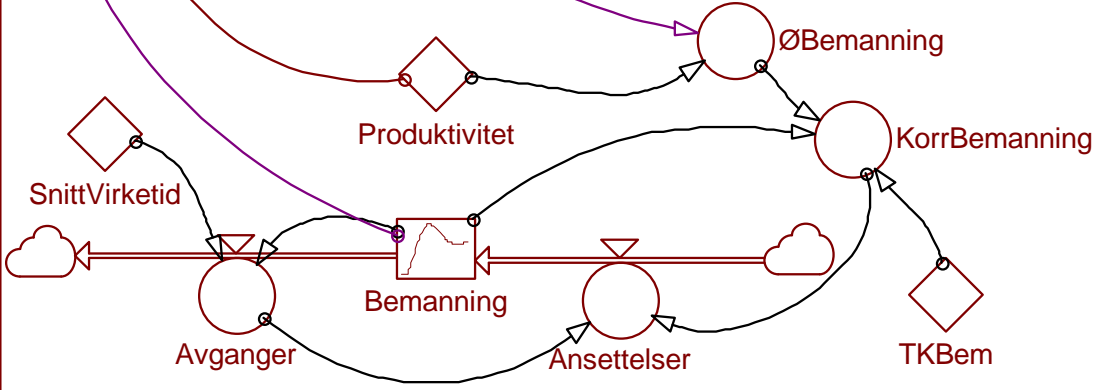
OrdrebokHåndtering



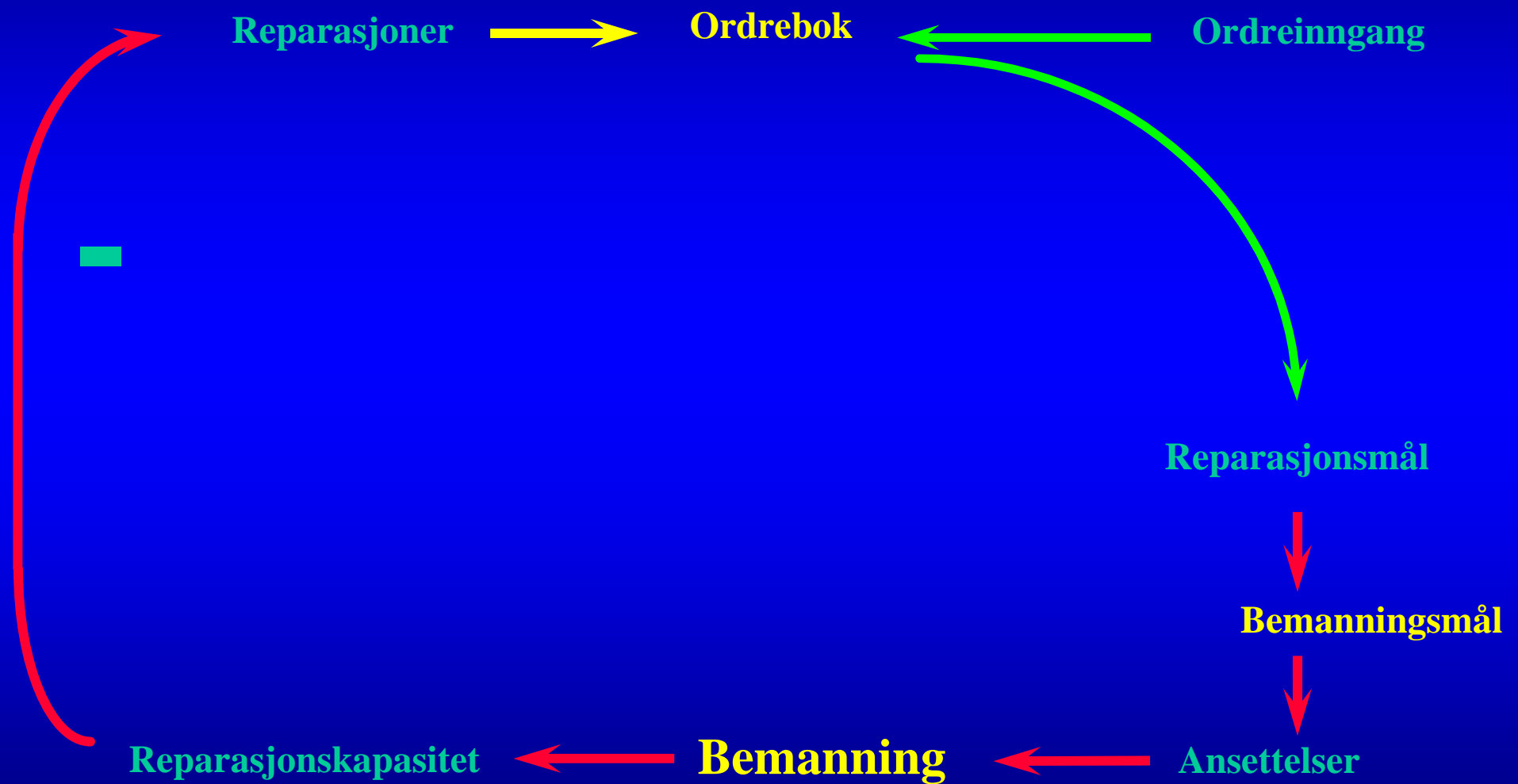
Forventninger

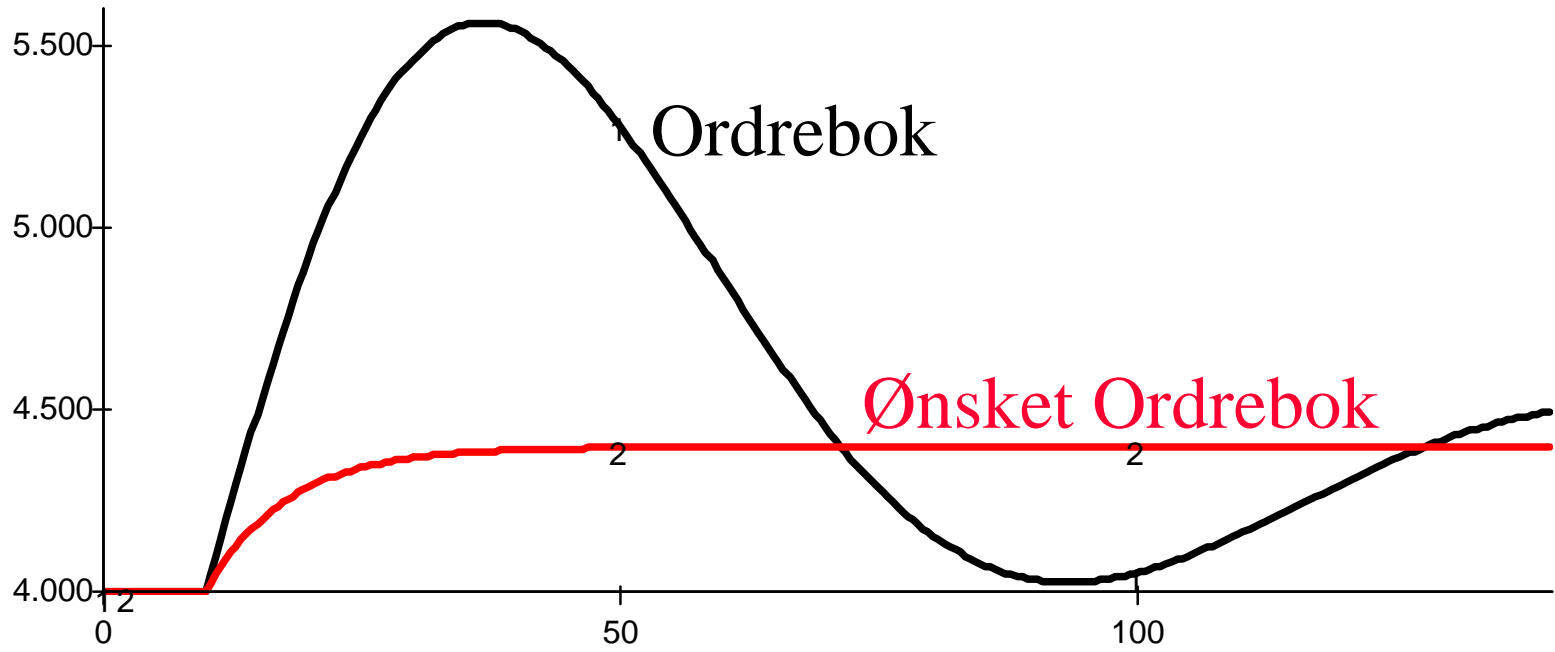
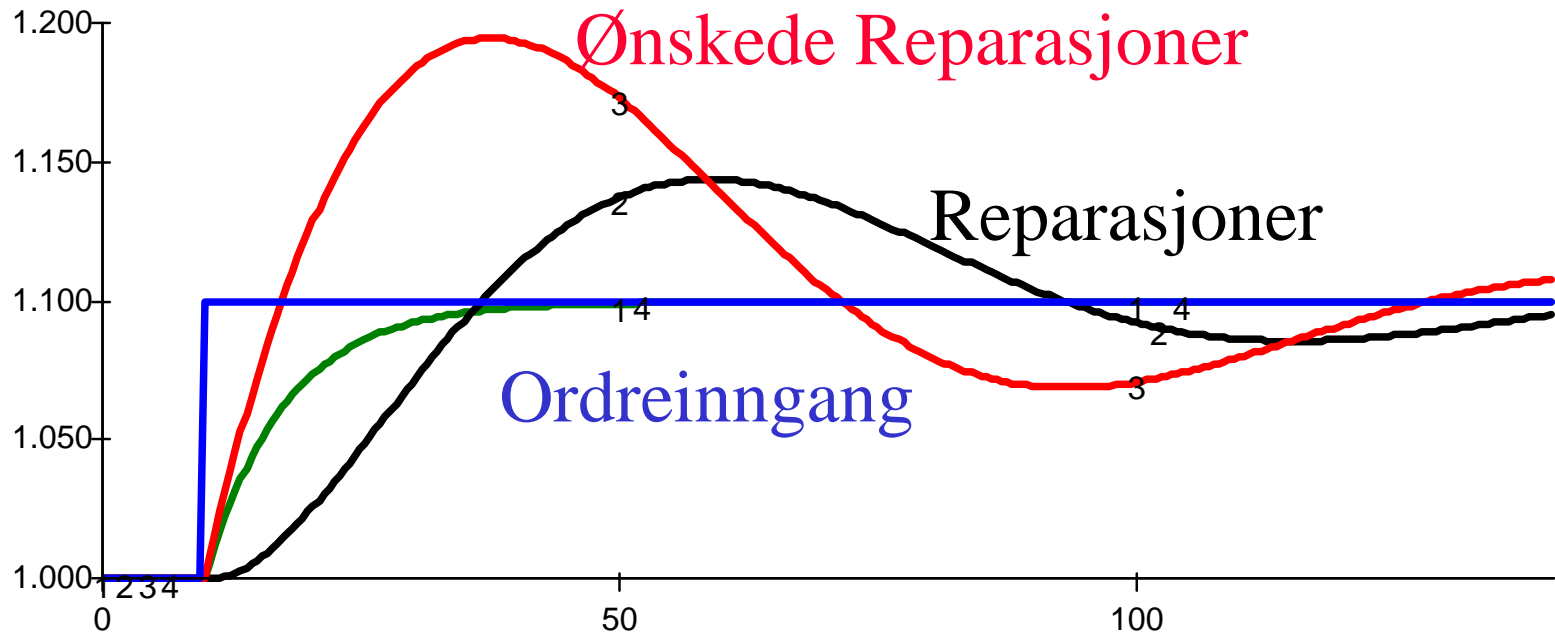


Bemanningshåndtering



Problem Struktur

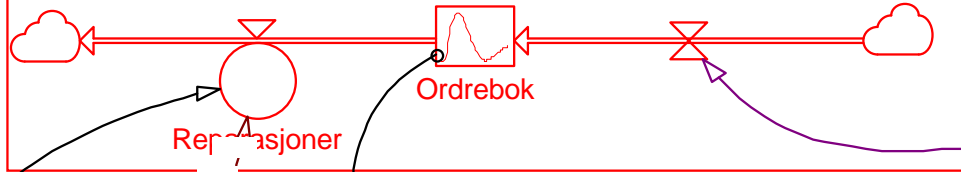




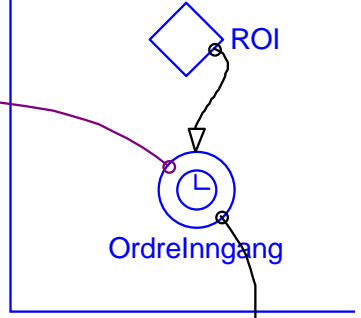
Løsning

Overtid

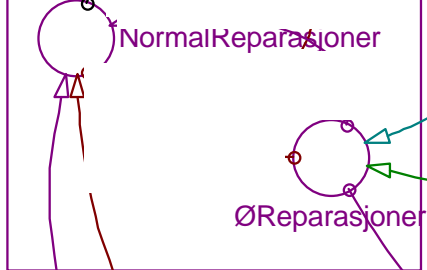
Backlog



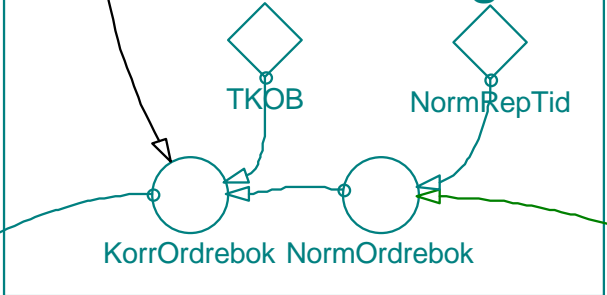
Ordreinngang



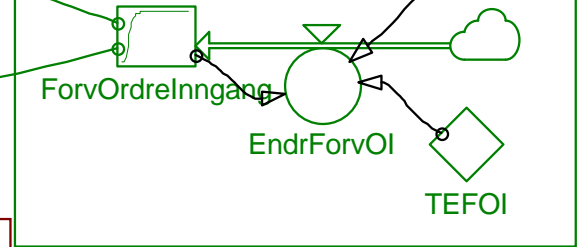
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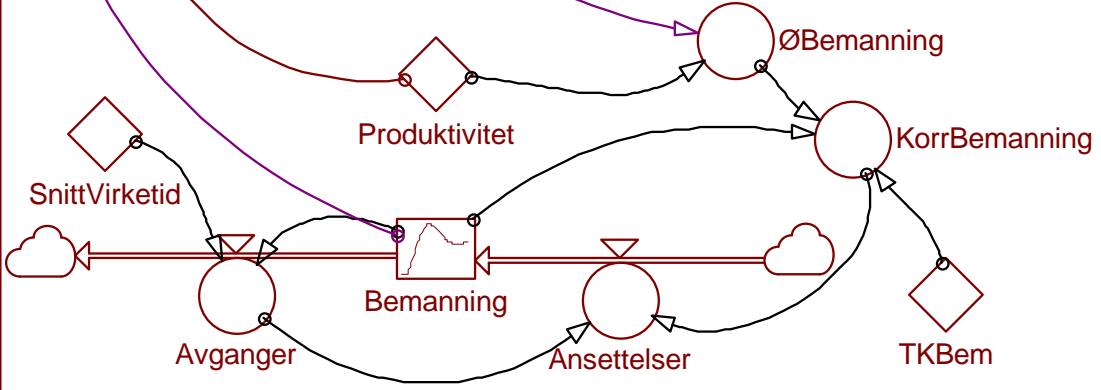
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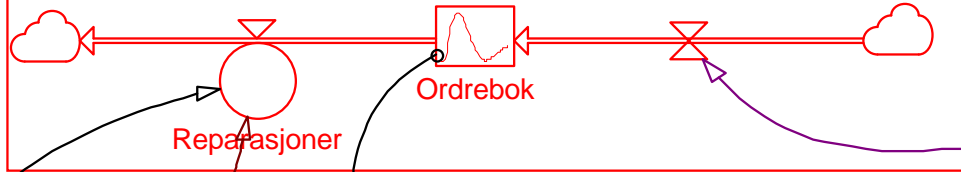
Forventninger



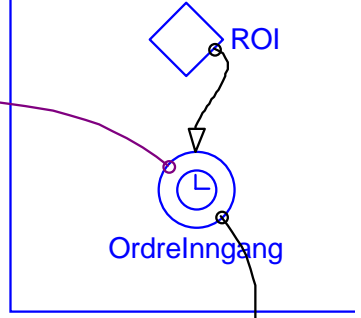
Bemanningshåndtering



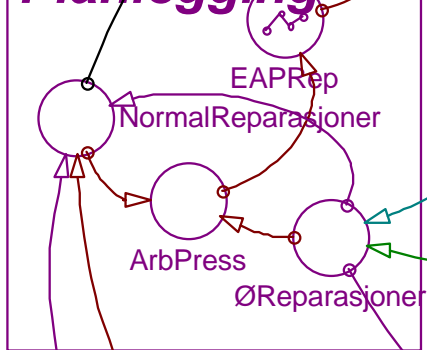
Backlog



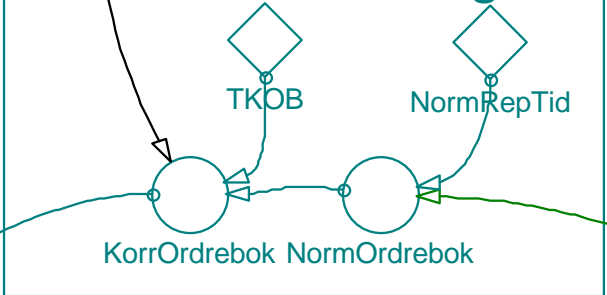
Ordreinngang



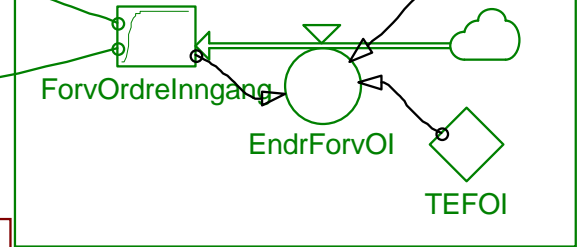
Produksjons Planlegging



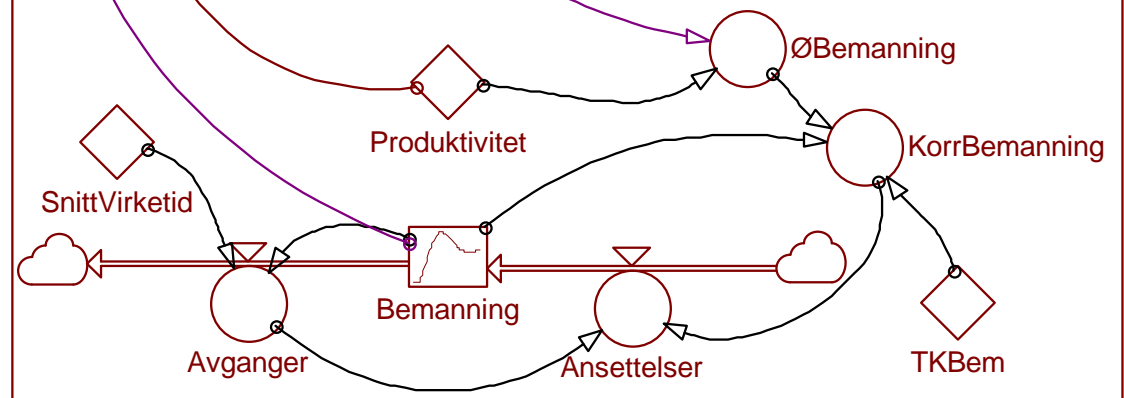
OrdrebokHåndtering

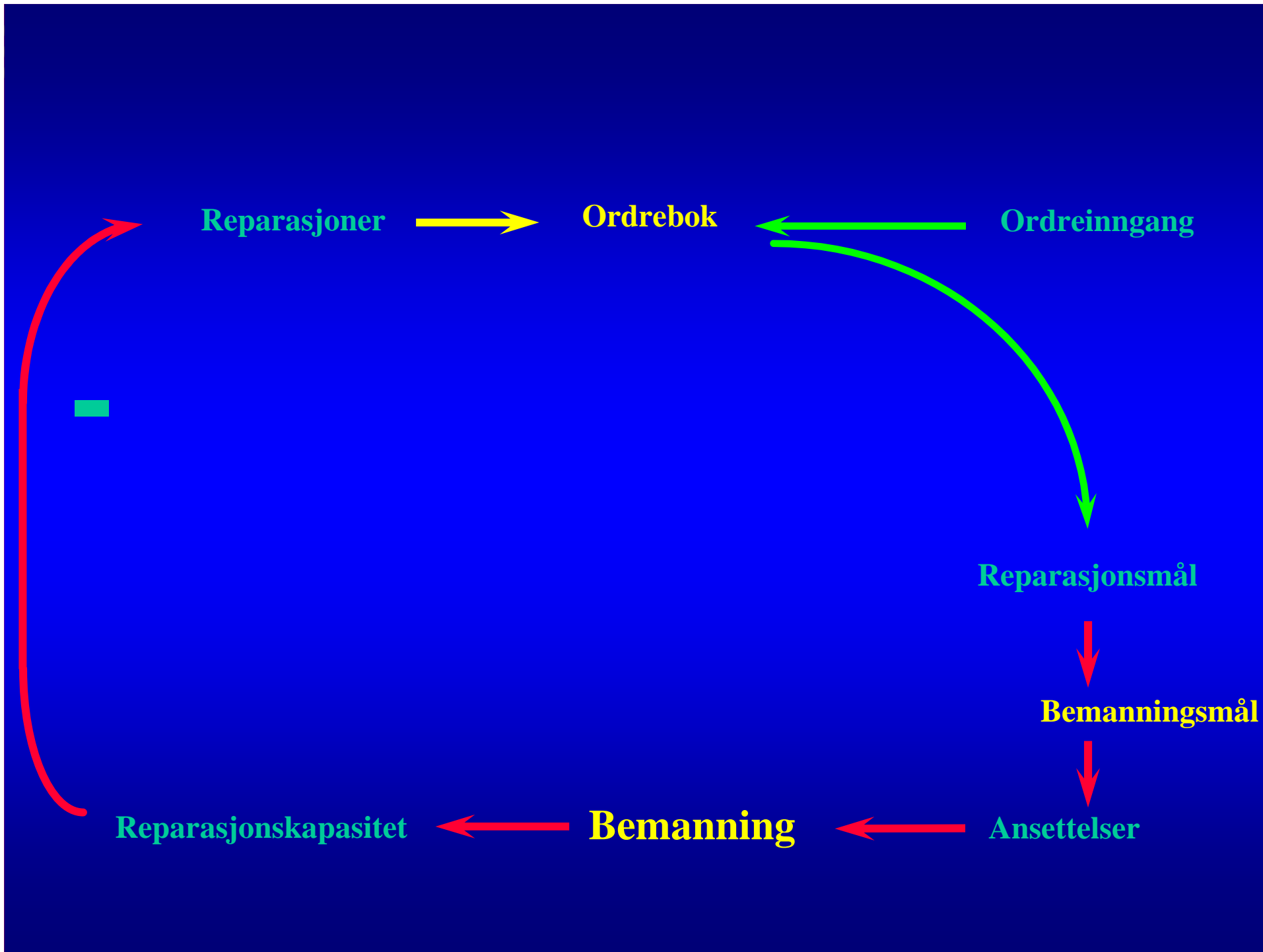


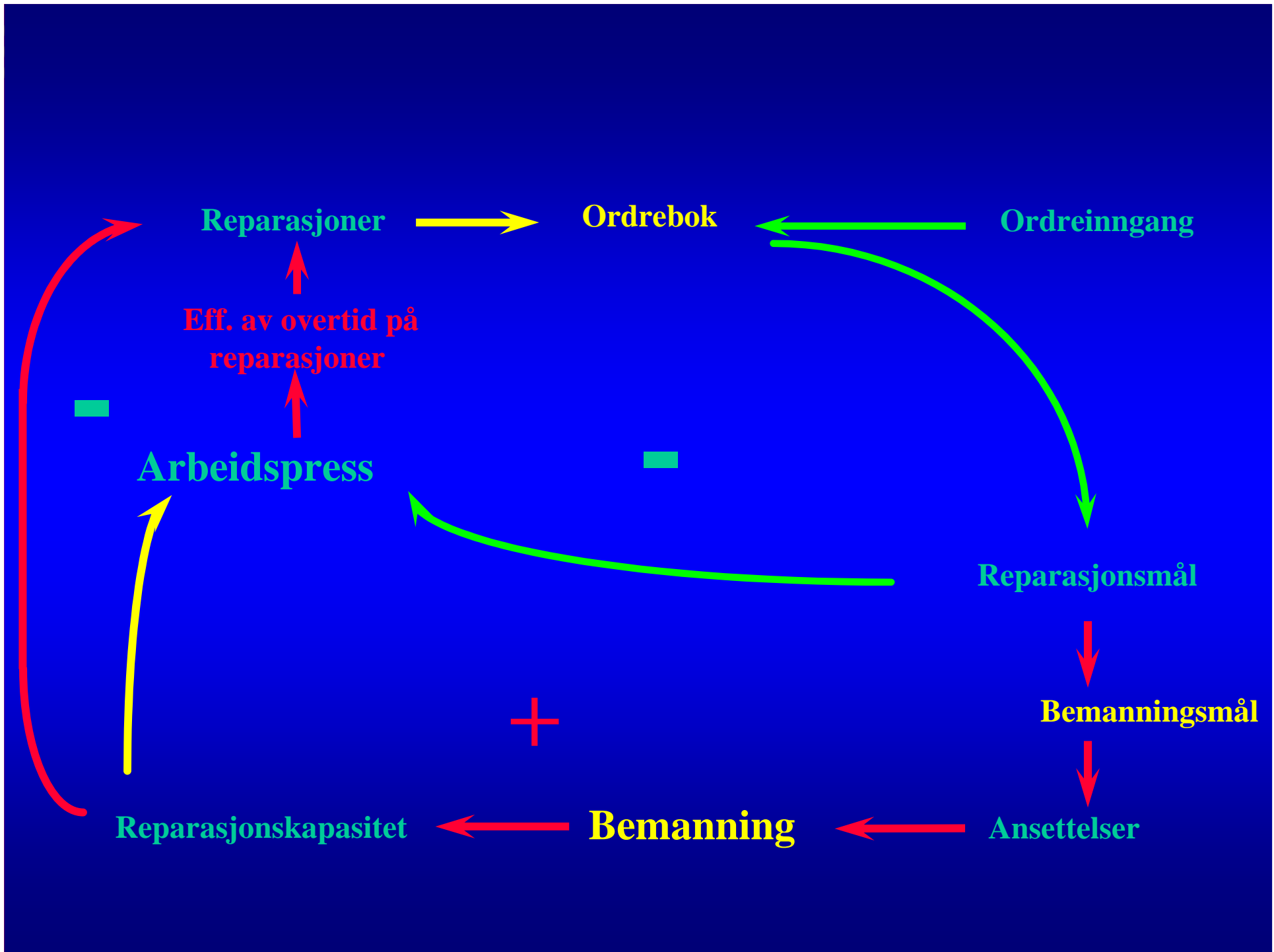
Forventninger

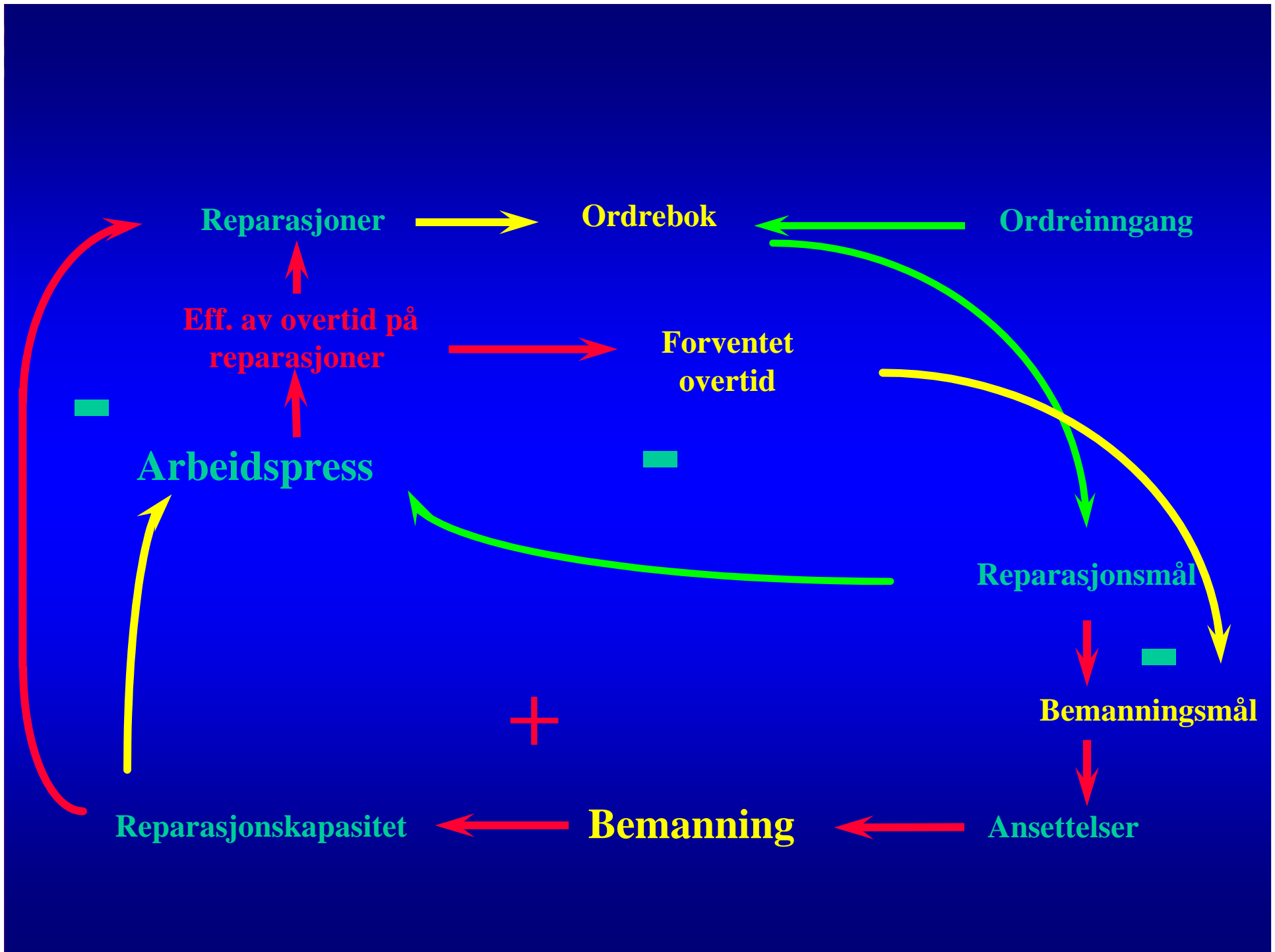


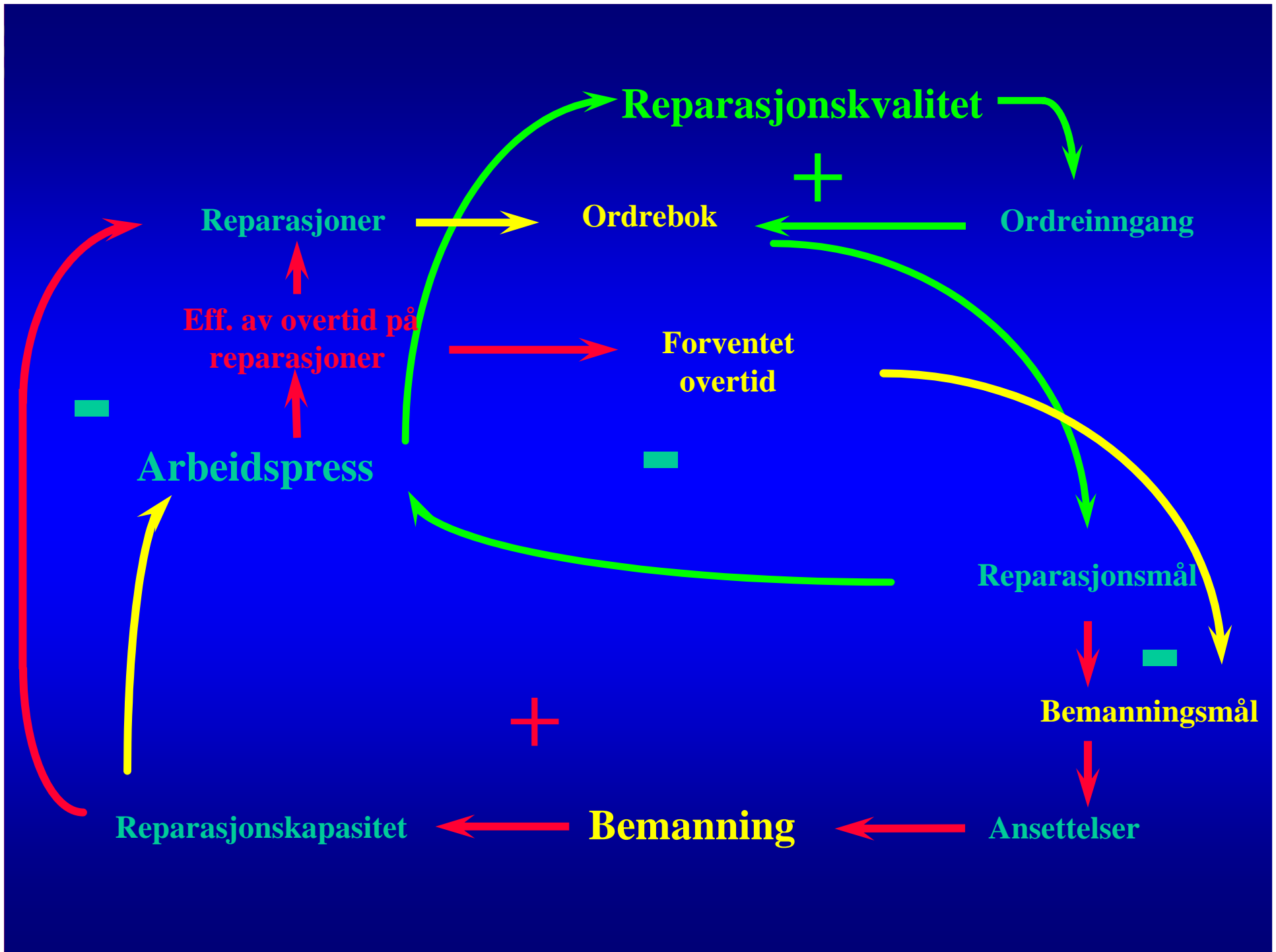
Bemanningshåndtering











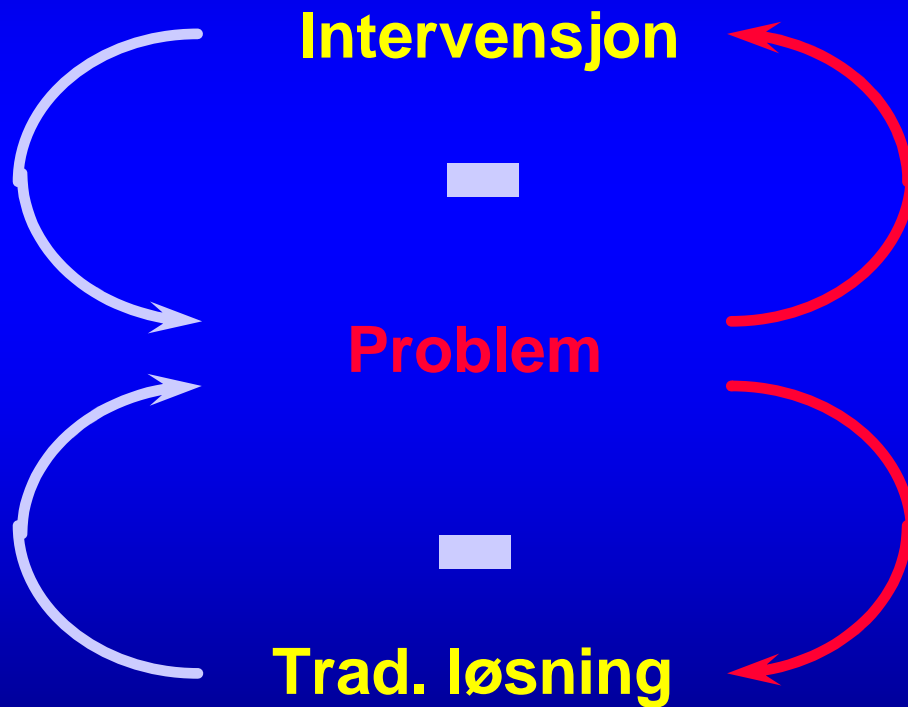
Klasse av utfordringer



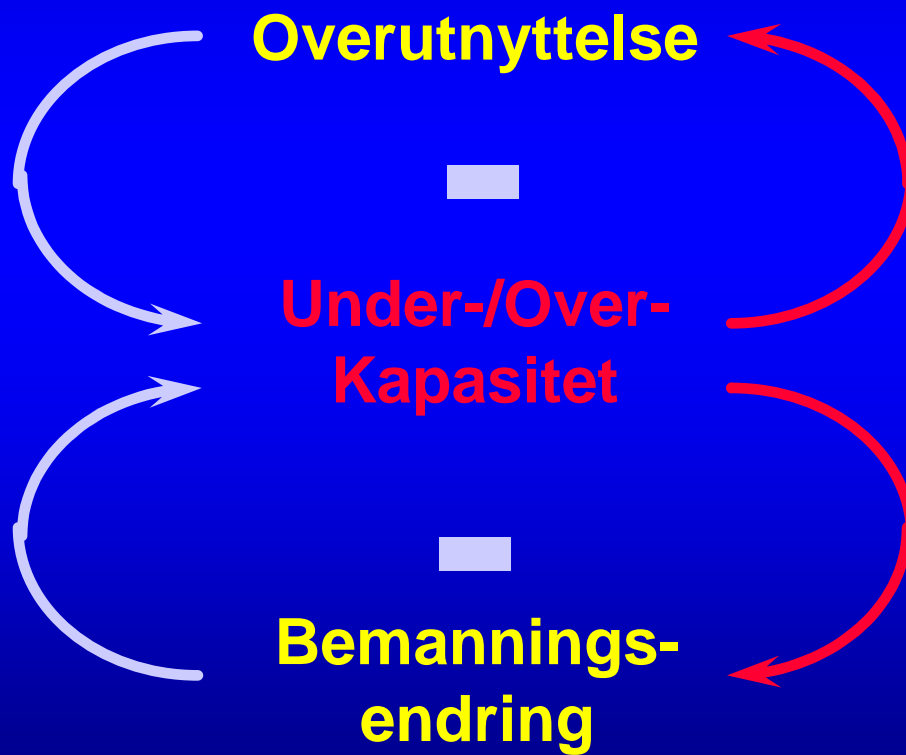
Spesifikk utfordring



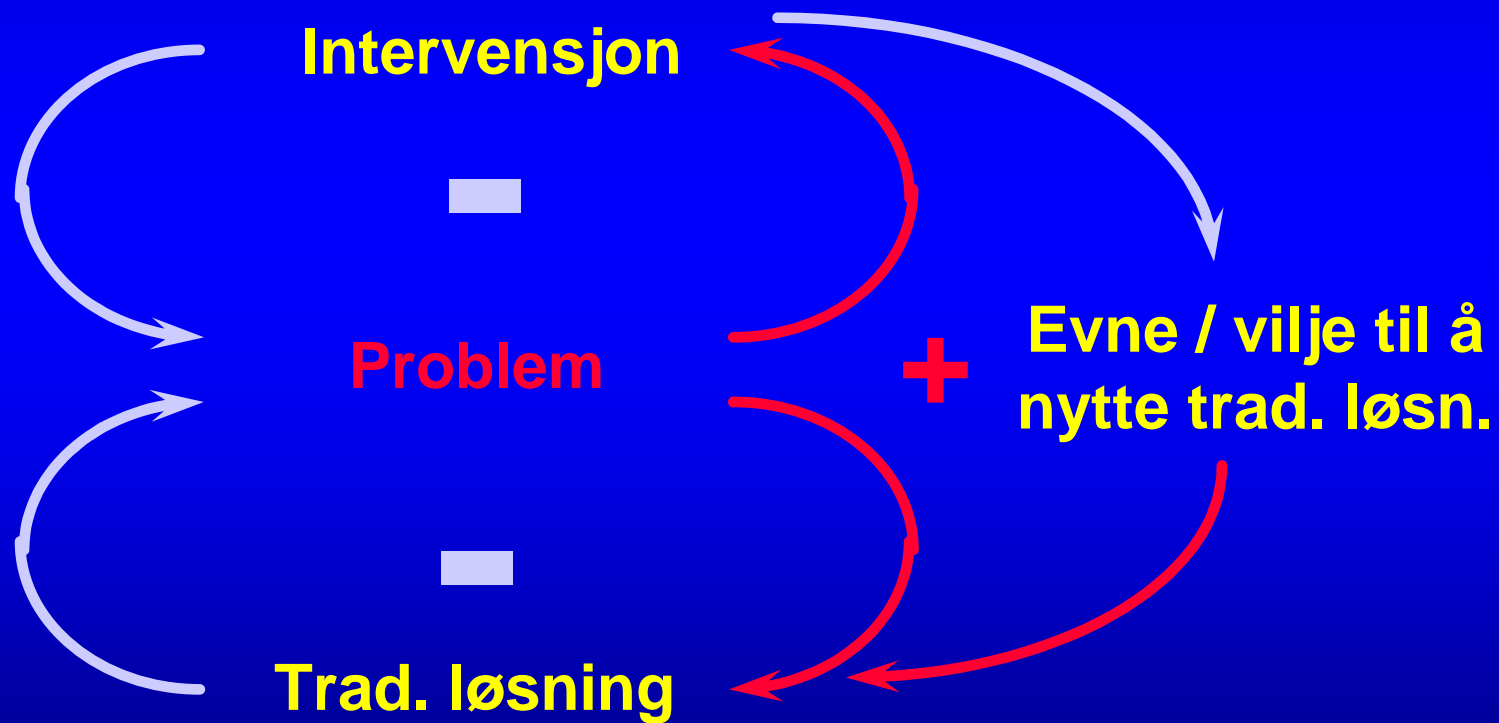
Klasse av Løsninger: Legge byrden på et mellomledd



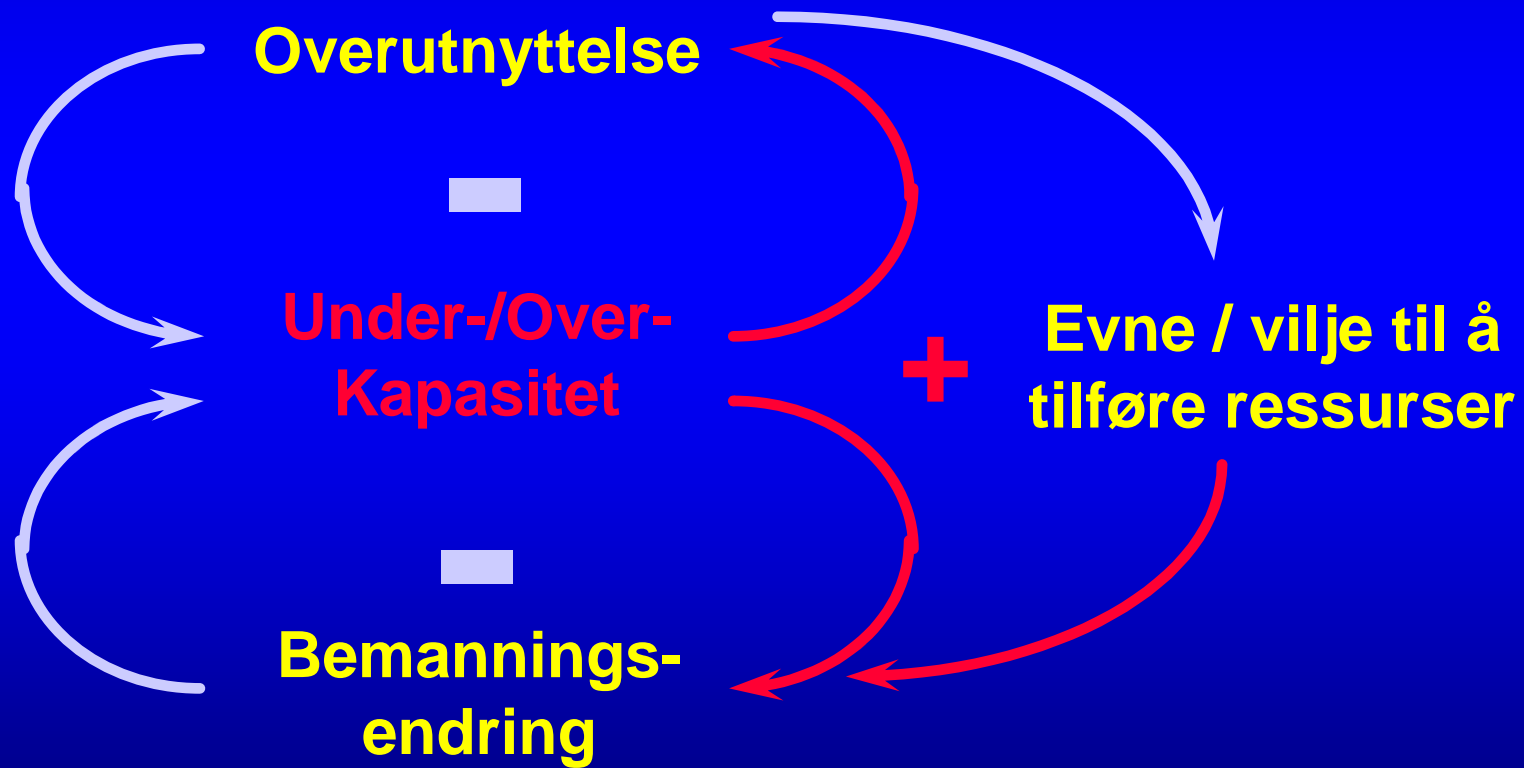
Spesifikk løsning: Legge byrden på ressursen



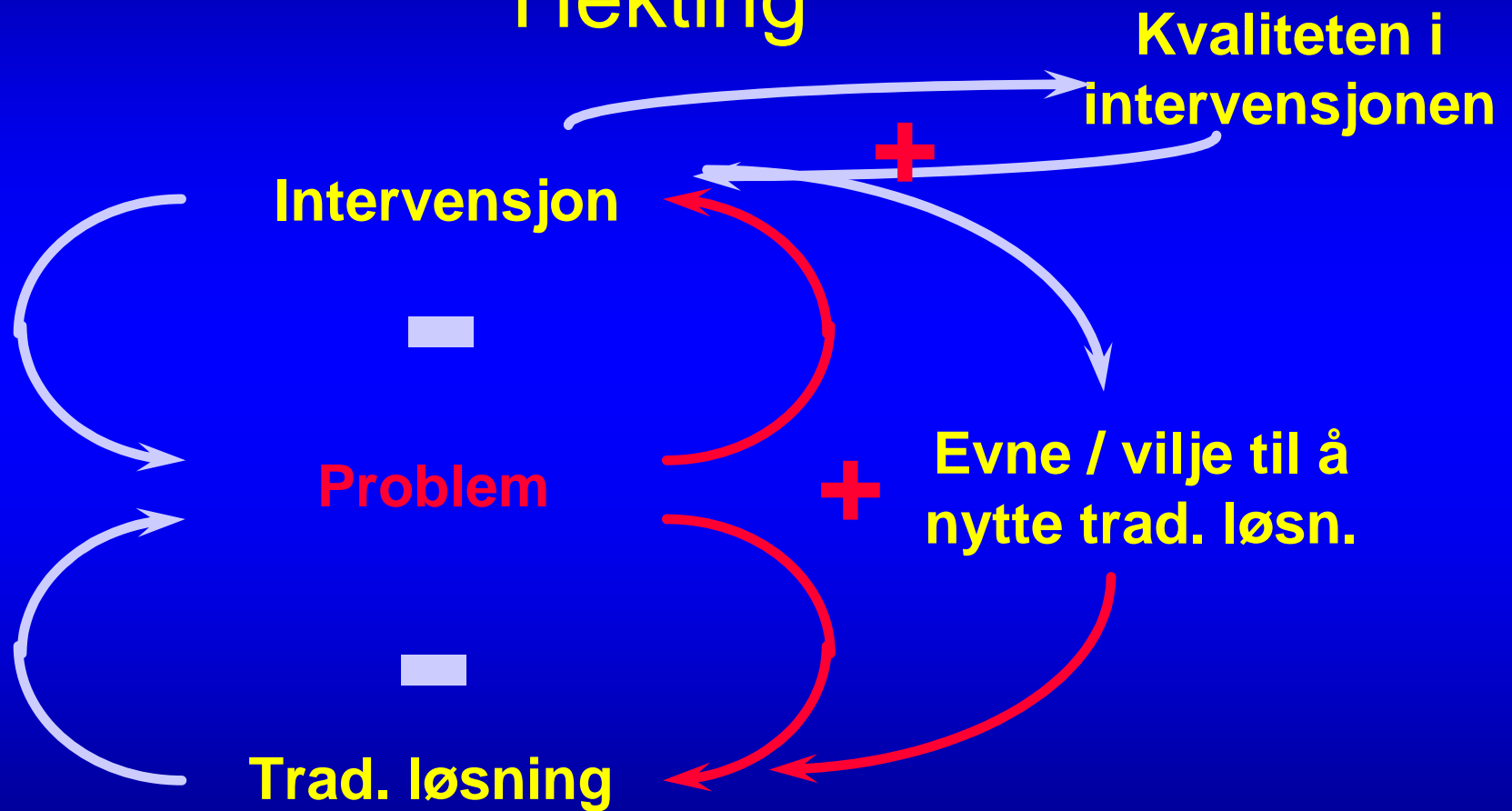
Bieffekt type I: Avhengighet



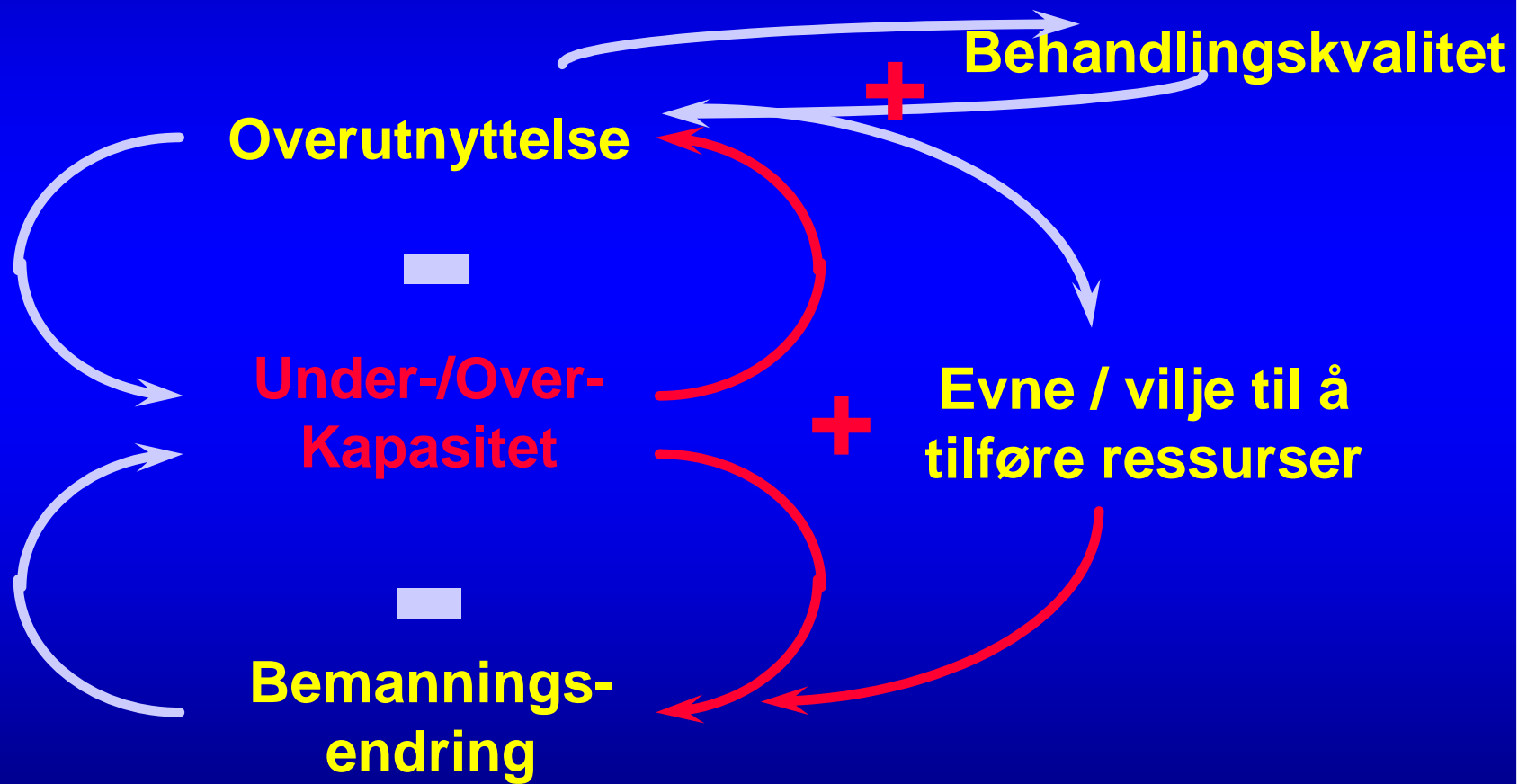
Bieffekt type I: Avhengighet



Bieffekt type II: Hekting



Bieffekt type II: Hekting



Tusen takk for
oppmerksomheten

!