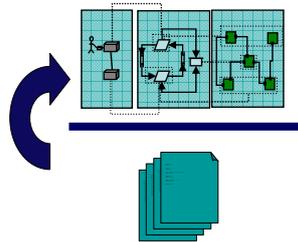


Welcome and Introduction

EOOLT'2007 – The 1st International Workshop on Equation-Based Object-Oriented Languages and Tools

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History – Models and Equations

Model knowledge is stored in books and human minds which computers cannot access

Internal-combustion engines 417

Thermodynamic compressive cycle as shown in the $p-v$ and $T-s$ diagrams

Let T_2 to T_1 , supplied by the heat exchanger, is cooled, with a thermal balance $Q_2 = Q_1$. If heat is completely exchanged, the quantity of heat to be added for unit of gas is reduced to $Q_1 - Q_2 = (T_2 - T_1) \ln \frac{V_2}{V_1}$ and the quantity of heat to be removed is $Q_2 = (T_2 - T_1) \ln \frac{V_2}{V_1}$.

The maximum thermal efficiency for the gas turbine with heat exchanger is $\eta_{th} = 1 - Q_2/Q_1 = 1 - (T_2 - T_1)/(T_1 - T_2)$.

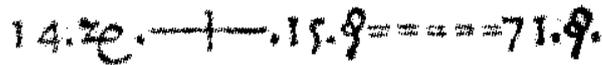
See further: 1. Flow and design, 2. Fuel-air compression, 3. Burner, 4. Heat exchanger, 5. Reaction wheel, 7. Power output, 8. Gas turbine, 9. Gas turbine, 10. Gas turbine, 11. Auxiliary equipment drive, 12. Lubricating oil pump.

“The change of motion is proportional to the motive force impressed”
 – Newton

Lex. II.
Mutationem motus proportionalem esse vi motrici impressae, & fieri secundum lineam rectam qua vis illa imprimitur.

History – Equation Sign Object Orientation

- Equations were used in the third millennium B.C.
- Equality sign was introduced by Robert Recorde in 1557

14.  15. 9 = 71. 9.

Newton still wrote text (Principia, vol. 1, 1686)

“The change of motion is proportional to the motive force impressed”

CSSL (1967) introduced a special form of “equation”:

variable = expression

$v = \text{INTEG}(F) / m$

Simula67 (1967) introduced object orientation

– Classes, Objects, Inheritance

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Equation-Based Object-Oriented Languages Approximate Characteristics?

- Systems of Equations
- Object Orientation
- Mostly declarative
- Hierarchical System Decomposition
- Reuse, Dynamic systems

- What is the key difference compared to other programming languages?
- Tentative answer: Acausality of equations?

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Challenges – Today and Tomorrow

- Engineering Complex Systems
- Model-driven development/engineering

- What is the special contribution of Equation-Based Object-Oriented Languages and Tools?
- What additional benefits can Acausal equations give?
- etc.?

- Topic of this workshop, Discuss, Brainstorm

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Thanks

- To the Authors for the papers
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- To the overall ECOOP Workshop organization committee, Michael Cebulla, et al
- To Stefan Jähnichen for the invitation

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