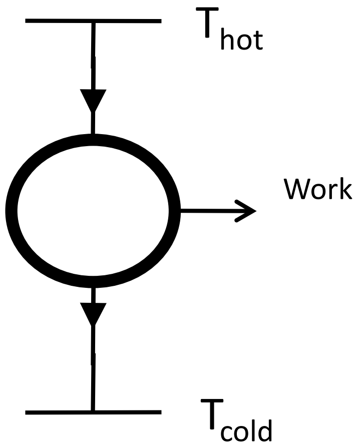
Conditions aux limites et rétroaction dans les systèmes thermodynamiques

Christophe Goupil, Henni Ouerdane Éric Herbert Giuliano Benenti Yves D'Angelo & Philippe lecoeur

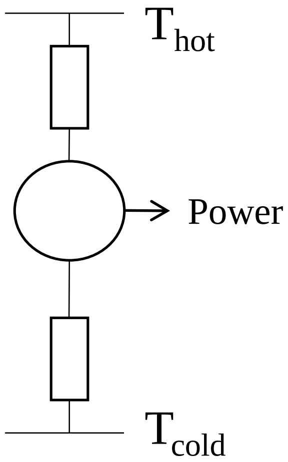
DyCo COUPLED DYNAMICS

LIED PIERI Laboratoire Interdisciplinaire des Energies de Demain — Paris 7 Interdisciplinary Energy Research Institute

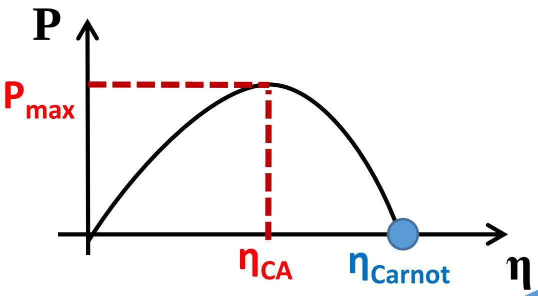


Finite Time Thermodynamics FTT

Endoreversible



$$\eta_C = \frac{W}{Q_{in}} = 1 - \frac{T_{cold}}{T_{hot}}$$



$$\eta_{CA} = \frac{\dot{W}}{\dot{Q}_{in}} = 1 - \sqrt{\frac{T_{cold}}{T_{hot}}}$$

The position of the point on the curve is defined by the intensity parameter which governs the output.

- **J. Yvon,** The saclay Reactor: Two Years of Experience in the Use of a Compresed gas as a Heat Transfer Agent, Proceedings of the International Conference on the Peaceful Uses of Atomic Energy (1955)
- **P. Chambadal** *Les centrales nucléaires*. Armand Colin, Paris, France, 4 1-58, (1957)
- **I.I. Novikov, Efficiency of an Atomic Power Generation Installation, Atomic Energy 3 (1957)**
- **F.L. Curzon & B. Ahlborn**, Efficiency of a Carnot Engine at Maximum Power Output, Am. J. Phys. 43 (1975)
- **For a review, see Ouerdane et al.., Eur. Phys. J. Special Topics 224, 839–864 (2015)**

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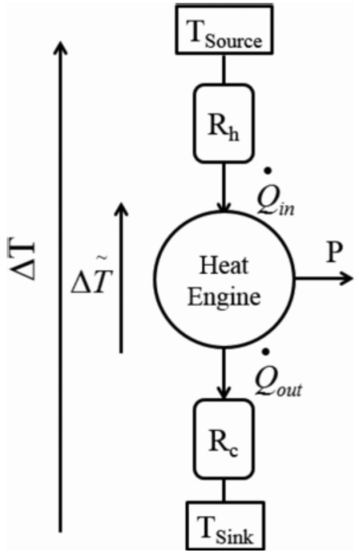
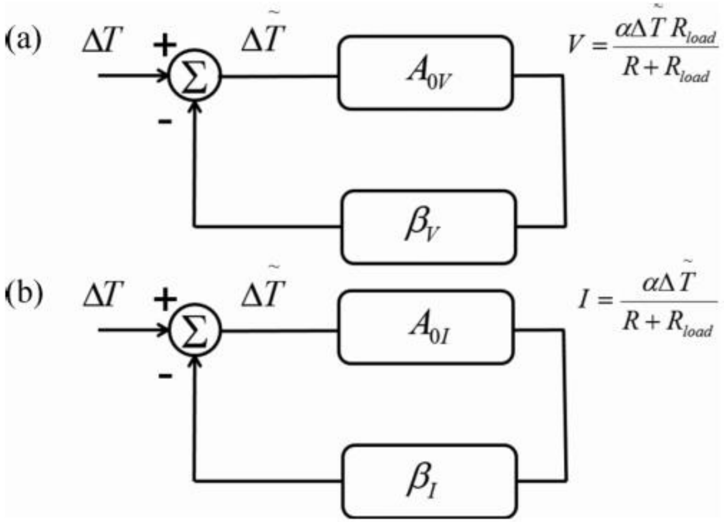
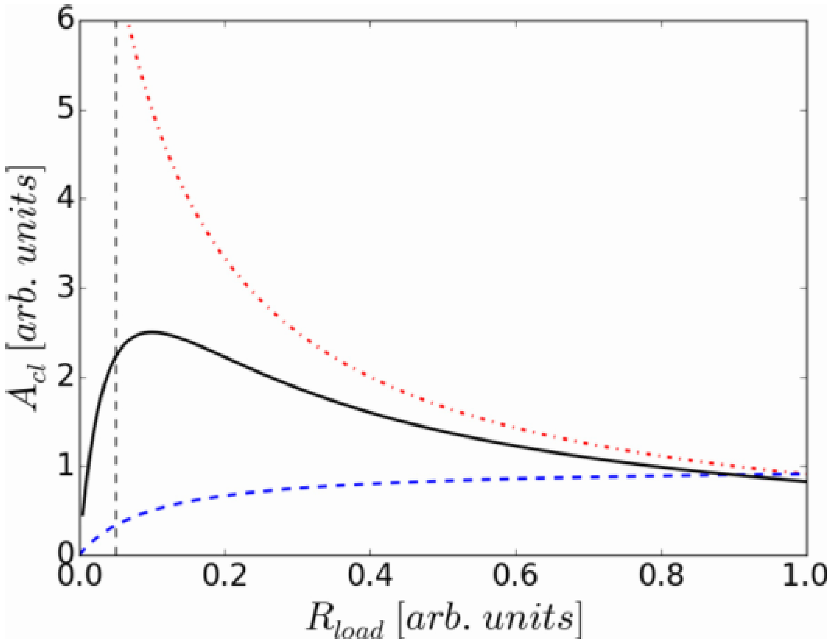
Closed-loop approach to thermodynamics

C. Goupil,[1,*] H. Ouerdane,[2,3] E. Herbert,[1] G. Benenti,[4,5] Y. D'Angelo,[1,6] and Ph. Lecoeur[7]







Conversion, feedback, and gain	A_{0V}	A_{0I}	β_V	β_I	$A_{\rm cl}$
Open-circuit	α	0	$\frac{R_\theta}{\alpha R_{\rm th}}$	∞	$\frac{\alpha}{1+\frac{R_\theta}{R_{\rm th}}}$
Short-circuit	0	$\frac{\alpha}{R_{\rm in}}$	∞	$\frac{R_\theta R_{\rm in}}{\alpha R_{\rm th}}$	0
Maximal power	$\frac{\alpha}{2}$	$\frac{\alpha}{2R_{\rm in}}$	$\frac{2R_\theta}{\alpha R_{\rm th}}$	$\frac{2R_\theta R_{\rm in}}{\alpha R_{\rm th}}$	$\frac{\frac{\alpha}{2}}{1+\frac{R_\theta}{R_{\rm th}}}$

$$A_{0V}\beta_V(i\omega) = \frac{R_\theta}{R_{\rm th0}}\left[1 + \frac{R_{\rm in}}{R_{\rm in}+R_{\rm load}} Z\overline{T}(i\omega)\right]$$