

58th CIRP Conference on Manufacturing Systems

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*Institute for Production Management, Technology and Machine Tools (PTW), Technical University of Darmstadt, Otto-Berndt-Str. 2, 64287 Darmstadt, Germany** Corresponding author. Tel.: +49-6151-8229-643. E-mail address: m.frank@ptw.tu-darmstadt.de**Abstract**

The development of transformation concepts to achieve net zero emissions for production sites is a complex planning task. It requires transparent and reliable derivation processes, considering economical and technical aspects. In various use cases mathematical optimization proved to be a suitable method. Current approaches use the greenhouse gas emission reduction as an objective function. Applying this, neglects the economical reality of production sites, because applied to the energy supply system alone, it does not consider production process specific aspects. Therefore, the optimization delivers economically infeasible solutions. We present in this article an mathematical optimization approach that considers the energy productivity of a production site as an objective function. By the integration of the production processes and the energy supply system we achieve economically feasible solutions.

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Keywords: Type your keywords here, separated by semicolons ;**1. Main Text**

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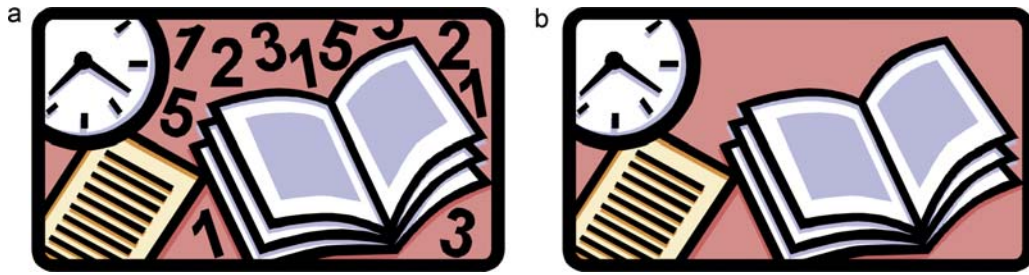


Fig. 1. (a) first picture; (b) second picture.

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$$X_r = \dot{Q}_{rad}'' / (\dot{Q}_{rad}'' + \dot{Q}_{conv}'')$$

$$\rho = \frac{\vec{E}}{J_c(T = \text{const.}) \cdot \left(P \cdot \left(\frac{\vec{E}}{E_c} \right)^m + (1 - P) \right)} \quad (1)$$

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A.1. Example of a sub-heading within an appendix

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References

- [1] Gilbert Fridgen, Robert Keller, Marc-Fabian Körner, Michael Schöpf, [A holistic view on sector coupling](#), Energy Policy 147 (2020) 111913. doi:10.1016/j.enpol.2020.111913.
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