

Algorithmic Solution of Luminaries Placement - Reflections and Symmetry Issues

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Abstract—The paper deals with lighting road design. The demands on illuminance are defined in standard ČSN EN 13201 in case of Czech Republic. There are several parameters that a designer can change to get the optimal solution to fulfill the standard. The distance between pillars, their heights, the lamp overlap and tilt have to be defined. Such number of parameters make the optimization difficult. This paper solves the optimization via genetic algorithm. The fitness function that is convergent to good solutions is a vital point for this type of algorithms. The paper shows that solutions found by the genetic algorithm fulfill the demands and it also shows the way, how the fitness function can be created.

Keywords - *genetic algorithm, lighting, design, illuminance*

I. INTERIOR LIGHTENING DESIGN ISSUES

II. PHOTOMETRIC VALUE CALCULATION

III. ALGORITHM DESCRIPTION

IV. SYMMETRY SOLUTION

One of the requirements to the output design was

V. PROGRAM BEHAVIOR

dva typy symetrie. Pro středovou jsou výsledky více kreativní. Velká souvislost mezi délkou DNA a nastavenou mutací. Pro velkou mutaci program špatně konverguje. optimálně je pro 200 0.01

VI. RESULTS IN PROGRAM BUILDING DESIGN

VII. CONCLUSION

Here comes conclusion.

REFERENCES

- [1] ČSN EN 13201-1. *Road lighting - Part 1: Selection of lighting classes*. march 2007. Prague: Český normalizační institut, 2007.
- [2] ČSN EN 13201-2. *Road lighting - Part 2: Performance requirements*. may 2005. Prague: Český normalizační institut, 2005.
- [3] ČSN EN 13201-2 ZMĚNA Z1. *Road lighting - Part 2: Performance requirements*. march 2007. Prague: Český normalizační institut, 2007.
- [4] ČSN EN 13201-3. *Road lighting - Part 3: Calculation of performance*. may 2005. Prague: Český normalizační institut, 2005.
- [5] VIALOX NAV-T SUPER 6Y. OSRAM GMBH. *Osram* [online]. 2015 [cit. 2015-02-18]. Available at: http://www.osram.com/osram_com/products/lamps/high-intensity-discharge-lamps/high-pressure-sodium-vapor-lamps-for-open-and-enclosed-luminaires/vialox-nav-t-super-6y/index.jsp
- [6] J. Habel. *Světlo a osvětlování*. Praha: FCC Public, 2013, 622 s. ISBN 978-80-86534-21-3.
- [7] I. Zelinka, Z. Oplatková, M. Šeda, P. Ošmera, F. Včelař. *Evoluční výpočetní techniky: principy a aplikace*. 1. české vyd. Praha: BEN, 2009, 534 s. ISBN 978-80-7300-218-3.
- [8] D. B. Fogel. *Evolutionary computation: toward a new philosophy of machine intelligence*. 3rd ed. Hoboken: John Wiley, 2006, xvii, 274 s. ISBN 04-716-6951-2.
- [9] Eulumat. *Helios32* [online]. 1999-2014 [cit. 2015-02-19]. Available at: <http://www.helios32.com/Eulumat.htm>
- [10] SCHREDER GULF - Products - ATOS. *SCHREDER GULF* [online]. 2015 [cit. 2015-02-19]. Available at: <http://www.schreder.com/en-aes/Products/Pages/ATOS.aspx>