

Rapid Detailing Method for Continuously Varying Steel Reinforcement Sizes: Postprint

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Abstract

This paper discusses several current methods for detailing continuously varying rebar dimensions, introduces the advantages of using AutoCAD for rebar detailing, and implements automation through the Lisp language. Finally, combined with a bridge pier case study, it elaborates on the general procedure for rapid detailing of continuously varying rebar dimensions using the Lisp language.

Full Text

Preamble

The following mathematical framework establishes the foundational notation and computational primitives for the analysis. The system is defined through a series of mathematical relationships denoted as \mathcal{E} through \mathcal{S} : (, ; # % 0 # < C % & # % ”” (# % & 4 *) , (* . , (J > , (8 * . # , % * < 1 ” , & (* 26 # 0 F . * . ” L , % # . , (# % & # 4 * % A 6 , / ‘@ % %’ % # +6 # % * ” < P 5 @ 7 6 8 @ \$, which collectively describe the core algebraic structures and operational semantics.

Key technical components referenced in this preamble include the operational modules GFAC, JA₋, 0FAn, and A>+F, along with variable constructs such as bZ3 and the transformation operator +>GA. The notation ./A;JE represents the primary computational pathway, while expressions like J<0 and ;66J<E denote critical state variables and boundary conditions respectively.

The framework introduces several functional categories: FE>An for evaluation metrics, Q>G[^] for query operations, and AC.D for configuration parameters. These operate within the context defined by $\mathcal{E} > J + 0 3 + J b F + k (\% \$ \text{ through } \$\$) \% F E > A n L > E A] k ! G + > E F n > 6 J 0 F \% \% ! E > 6 Z n A > + F > 6 0 n = F ’ ” ! E > 6 ’ n A > + F > 6 0 n = F ’ ” > 6 0 n G + E ” ! F < E n > 6 J 0 F ” ’ (* ! e j d q R \$, which specify the dimensional constraints and initialization protocols.$

Additional specifications cover recursive structures ($M \rightarrow E$), iterative processes ($A < 0$), and conditional branching ($E \rightarrow F$). The system parameters are further refined in E , addressing convergence criteria and stability conditions. The preamble concludes with the validation schema $Q >] < 0 c > < \& \# \$$ and $31 * \% - / : (, ; \# \% 0 \# * < C \% \& \# \% \text{''} (\# \% \& 4 *) , (* . , (J > , (8 * . \# , \% * < 1 \text{''} , \& (* 26 \# 0 F . * . \text{''} L , \% \# . , (\# \% \& \# 4 * \% A 6 , / ' @ \% \% ' \% \# + 6 \# \% * \text{''} < P 5 @ 7 6 8 @ \$$, which establish the verification procedures for the complete mathematical construct.

Note: Figure translations are in progress. See original paper for figures.

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