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A NON-NEGATIVE, NON-LINEAR PETROV-GALERKIN METHOD FOR BILINEAR DISCONTINUOUS DIFFERENCING OF THE S_N EQUATIONS

Peter G. Maginot, Jean C. Ragusa*, and Jim E. Morel
Department of Nuclear Engineering
Texas A&M University
3133 TAMU, College Station, TX 77843
pmaginot@tamu.edu; jean.ragusa@tamu.edu; morel@tamu.edu

ABSTRACT

We have developed a new, non-negative, non-linear Petrov-Galerkin discontinuous finite element method (NNPGDFEM), for use in conjunction with Galerkin bilinear discontinuous (BLD) finite element differencing of the 2-D Cartesian geometry S_N equations for quadrilaterals on an unstructured mesh. This work is an extension of the idea that drove our previous development of a NNPGDFEM for use with linear discontinuous (LD) differencing of the 2-D Cartesian geometry S_N equations for rectangular mesh cells. We present the theory and equations that describe the new method. In addition, we provide initial numerical results that verify the method yields strictly non-negative solutions and that the new method is always at least as accurate as BLD.

Key Words: Radiation transport, DFEM, non-negative, bilinear, quadrilaterals

1 INTRODUCTION

References can be typeset properly using the provided BIBTEXstyle file. See examples of a journal [1], conference proceedings [2], book [3], and miscellaneous [4].

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1.2 Subsection Title: First Character of Each Non-trivial Word is Uppercase

Equations (Equation 1) should be centered and sequentially numbered to the flush right of the formula.

*Corresponding author

Table I. Sample table: accuracy of nodal and characteristic methods

Mesh	8 x 8	16 x 16	32 x 32	64 x 64
Nodal	$1.000 \cdot 10^{-1}$	$2.500 \cdot 10^{-2}$	$6.250 \cdot 10^{-3}$	$1.563 \cdot 10^{-3}$
Characteristic	$1.000 \cdot 10^{-1}$	$2.500 \cdot 10^{-2}$	$6.250 \cdot 10^{-3}$	$1.563 \cdot 10^{-3}$

$$1 + 1 = 2 \tag{1}$$

The continuation of a paragraph after an equation is not indented

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2 CONCLUSIONS

Present your summary and conclusions here.

3 ACKNOWLEDGMENTS

Acknowledge the help of colleagues and sources of funding, as appropriate, including Paul Romano and Tom Sutton, who provided this template that is similar to a template from past M&C meetings.

4 REFERENCES

[1] B. Author(s), "Title," *Journal Name in Italic*, **Volume in Bold**, pp. 34–89 (19xx).

[2] C. D. Author(s), "Article Title," *Proceeding of Meeting*, Location, Dates of Meeting, 19xx.

[3] E. F. Author, *Book Title*, Publisher, City, Country (19xx).

[4] "Spallation Neutron Source: The next-generation neutron-scattering facility for the United States," 2002, http://www.sns.gov/documetation/sns_brochure.pdf.

APPENDIX A

If necessary, include Appendices numbered in upper case alphabetical order.

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