Presentation of P1385R7 to LEWG at Issaquah 2023
P1385R7

Summary for LEWG, Issaquah 2023
How did we get here...

- R0, R1 Kona 2019
- Presented to LEWG(I)
- 0-based indexing, no separate row/column vector, named operations in addition to operators
- Presented to SG6/SG14/SG19
- Single vector class required
- Vector-vector product should be inner product, outer product should be named function
How did we get here...

• R2 Cologne 2020
• Monthly SIG calls
• SG6/SG14/SG19 joint meeting forwards to LEWG
How did we get here...

- R3 Belfast 2019
- SG6 don’t need further review
- LEWG(I) all good, please ensure Kona matters are addressed
- R4 included feedback
How did we get here...

• R5 Prague 2020
• No consensus for vector * vector
• Consensus for matrix * vector, vector * matrix and matrix * matrix
• R6 Pulled vector * vector, added inner_product and outer_product function templates
Lockdown

• Lots of introspection.

• Infix operators are a key motivation of the paper, incomplete provision is confusing, inconsistent and unappetising.

• Separate row and column vectors are not wanted; explicit inner and outer product required instead

• Let’s remove vectors altogether. They are single-row or single-column matrices, after all.

• If there is still appetite for vectors and explicit function names, we can add them subsequently.
Today

• R7 Issaquah 2023
• Withdraw vectors. Paper is 20 pages shorter. Naming simplified.
• https://wiki.edg.com/bin/view/Wg21kona2022/P1385-20221107-SG6
• SG6 happy:

  “SG6 supports the removal of the vector type and generalizing matrix instead.”

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  9| 2| 1| 0| 0
Today

• R7 Issaquah 2023
• Withdraw vectors. Paper is 20 pages shorter. Naming simplified.
• [https://wiki.edg.com/bin/view/Wg21kona2022/P1385-20221107-SG6](https://wiki.edg.com/bin/view/Wg21kona2022/P1385-20221107-SG6)
• SG6 happy:
  “SG6 encourages the addition of row_vector and column_vector template aliases.”

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 4| 2| 6| 0| 0
Of interest...

• What we are defining is a “linear mapping”, more than it is a “matrix”
• A tensor is a multi-linear mapping
• The elements of a linear mapping don’t have to be numeric types, they can also be functions
• We may have lost sight of the incremental nature of adding this facility
What we want to know

- Does LEWG support SG6’s encouragement of the single matrix class approach, and the later addition of vectors if requested?
- Is linear_mapping a superior name?
- Is there a still smaller proposal trying to get out?