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Audience: LEWG

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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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 encourages the addition of `row_vector` and `column_vector` template aliases.”

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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?