

Tests for Mathematica language
upvalues usage. This was related to
the development of my GA30.m
module.

```
ClearAll[Scalar, Vector, Bivector, Trivector, Blade, e0, e123, e]

e[0] := IdentityMatrix[2];
e[k_Integer /; k > 0 && k ≤ 3] := PauliMatrix[k];
e[k_Integer /; k > 0 && k ≤ 3, j_Integer /; j > 0 && j ≤ 3] :=
  PauliMatrix[k] . PauliMatrix[j];
e123 = I e0;

(*Represent a blade as a list:

Blade: {grade, coefficient, basisElement }

or:

Blade: {grade, coefficient, basisElement }

*)

Scalar /: Scalar[v] = Blade[0, v]
Scalar[v_] := {scalarType, v IdentityMatrix[2]};
Vector[v_, k_Integer /; k > 0 && k < 4] := {vectorType, v PauliMatrix[k]};
Bivector[v_, k_Integer /; k > 0 && k < 4, j_Integer /; j > 0 && j < 4] :=
  {bivectorType, v PauliMatrix[k] . PauliMatrix[j]};
Trivector[v_] := {trivectorType, v I IdentityMatrix[2]};
```