$U(2,2) \rightarrow U(2) \times U(2)$ decompositions

The branching rules given below all involve irreducible representations of the form $\{2(\overline{m};m)\}$ where m is a nonegative integer where the notation follows King and Wybourne (J.Phys. A:Math.Gen. **18**,3113-3139 (1985)). While these decompositions have been evaluated for $U(2,2) \rightarrow U(2) \times U(2)$ they in fact hold without modification for $U(p,q) \rightarrow U(q) \times U(p)$ when $p,q \geq 2$. These were all evaluated using standard commands in SCHUR. These branching rules are relevant to the two-electron problem. The discrete states of a single electron in a Coulomb field belong to the irrep $\{1(\overline{0};0)\}$ of $SU(2,2)$ while for two non-interacting electrons one may resolve the Kronecker square as

$$\{1(\overline{0};0)\} \otimes \{2\} = \sum_{m=0}^{\infty} \{2(\overline{2m};2m\} \quad S=0$$

$$\{1(\overline{0};0)\} \otimes \{1^2\} = \sum_{m=0}^{\infty} \{2(\overline{2m+1};2m+1\} \quad S=1$$

$\{2(\overline{0};0)\} \rightarrow$

$\{\overline{0}\} \times \{0\}$	$+ \{\overline{1}\} \times \{1\}$	$+ \{\overline{1^2}\} \times \{1^2\}$	$+ \{\overline{2}\} \times \{2\}$
$+ \{\overline{21}\} \times \{21\}$	$+ \{\overline{2^2}\} \times \{2^2\}$	$+ \{\overline{3}\} \times \{3\}$	$+ \{\overline{31}\} \times \{31\}$
$+ \{\overline{32}\} \times \{32\}$	$+ \{\overline{3^2}\} \times \{3^2\}$	$+ \{\overline{4}\} \times \{4\}$	$+ \{\overline{41}\} \times \{41\}$
$+ \{\overline{42}\} \times \{42\}$	$+ \{\overline{43}\} \times \{43\}$	$+ \{\overline{4^2}\} \times \{4^2\}$	$+ \{\overline{5}\} \times \{5\}$
$+ \{\overline{51}\} \times \{51\}$	$+ \{\overline{52}\} \times \{52\}$	$+ \{\overline{53}\} \times \{53\}$	$+ \{\overline{54}\} \times \{54\}$
$+ \{\overline{5^2}\} \times \{5^2\}$	$+ \{\overline{6}\} \times \{6\}$	$+ \{\overline{61}\} \times \{61\}$	$+ \{\overline{62}\} \times \{62\}$
$+ \{\overline{63}\} \times \{63\}$	$+ \{\overline{64}\} \times \{64\}$	$+ \{\overline{7}\} \times \{7\}$	$+ \{\overline{71}\} \times \{71\}$
$+ \{\overline{72}\} \times \{72\}$	$+ \{\overline{73}\} \times \{73\}$	$+ \{\overline{8}\} \times \{8\}$	$+ \{\overline{81}\} \times \{81\}$
$+ \{\overline{82}\} \times \{82\}$	$+ \{\overline{9}\} \times \{9\}$	$+ \{\overline{91}\} \times \{91\}$	$+ \{\overline{10}\} \times \{10\}$

$\{2(\overline{1};1)\} \rightarrow$

$\{\overline{1}\} \times \{1\}$	$+ \{\overline{1^2}\} \times \{2\}$	$+ \{\overline{2}\} \times \{1^2\}$	$+ \{\overline{2}\} \times \{2\}$
$+ \{\overline{21}\} \times \{21\}$	$+ \{\overline{21}\} \times \{3\}$	$+ \{2^2\} \times \{31\}$	$+ \{\overline{3}\} \times \{21\}$
$+ \{\overline{3}\} \times \{3\}$	$+ \{\overline{31}\} \times \{2^2\}$	$+ \{\overline{31}\} \times \{31\}$	$+ \{\overline{31}\} \times \{4\}$
$+ \{\overline{32}\} \times \{32\}$	$+ \{\overline{32}\} \times \{41\}$	$+ \{\overline{3^2}\} \times \{42\}$	$+ \{\overline{4}\} \times \{31\}$
$+ \{\overline{4}\} \times \{4\}$	$+ \{\overline{41}\} \times \{32\}$	$+ \{\overline{41}\} \times \{41\}$	$+ \{\overline{41}\} \times \{5\}$
$+ \{\overline{42}\} \times \{3^2\}$	$+ \{\overline{42}\} \times \{42\}$	$+ \{\overline{42}\} \times \{51\}$	$+ \{\overline{43}\} \times \{43\}$
$+ \{\overline{43}\} \times \{52\}$	$+ \{\overline{4^2}\} \times \{53\}$	$+ \{\overline{5}\} \times \{41\}$	$+ \{\overline{5}\} \times \{5\}$
$+ \{\overline{51}\} \times \{42\}$	$+ \{\overline{51}\} \times \{51\}$	$+ \{\overline{51}\} \times \{6\}$	$+ \{\overline{52}\} \times \{43\}$
$+ \{\overline{52}\} \times \{52\}$	$+ \{\overline{52}\} \times \{61\}$	$+ \{\overline{53}\} \times \{4^2\}$	$+ \{\overline{53}\} \times \{53\}$
$+ \{\overline{53}\} \times \{62\}$	$+ \{\overline{54}\} \times \{54\}$	$+ \{\overline{54}\} \times \{63\}$	$+ \{\overline{5^2}\} \times \{64\}$
$+ \{\overline{6}\} \times \{51\}$	$+ \{\overline{6}\} \times \{6\}$	$+ \{\overline{61}\} \times \{52\}$	$+ \{\overline{61}\} \times \{61\}$
$+ \{\overline{61}\} \times \{7\}$	$+ \{\overline{62}\} \times \{53\}$	$+ \{\overline{62}\} \times \{62\}$	$+ \{\overline{62}\} \times \{71\}$
$+ \{\overline{63}\} \times \{54\}$	$+ \{\overline{63}\} \times \{63\}$	$+ \{\overline{63}\} \times \{72\}$	$+ \{\overline{64}\} \times \{5^2\}$
$+ \{\overline{64}\} \times \{64\}$	$+ \{\overline{64}\} \times \{73\}$	$+ \{\overline{7}\} \times \{61\}$	$+ \{\overline{7}\} \times \{7\}$
$+ \{\overline{71}\} \times \{62\}$	$+ \{\overline{71}\} \times \{71\}$	$+ \{\overline{71}\} \times \{8\}$	$+ \{\overline{72}\} \times \{63\}$
$+ \{\overline{72}\} \times \{72\}$	$+ \{\overline{72}\} \times \{81\}$	$+ \{\overline{73}\} \times \{64\}$	$+ \{\overline{73}\} \times \{73\}$
$+ \{\overline{73}\} \times \{82\}$	$+ \{\overline{8}\} \times \{71\}$	$+ \{\overline{8}\} \times \{8\}$	$+ \{\overline{81}\} \times \{72\}$
$+ \{\overline{81}\} \times \{81\}$	$+ \{\overline{81}\} \times \{9\}$	$+ \{\overline{82}\} \times \{73\}$	$+ \{\overline{82}\} \times \{82\}$
$+ \{\overline{82}\} \times \{91\}$	$+ \{\overline{9}\} \times \{81\}$	$+ \{\overline{9}\} \times \{9\}$	$+ \{\overline{91}\} \times \{82\}$
$+ \{\overline{91}\} \times \{91\}$	$+ \{\overline{9}\} \times \{81\}$	$+ \{\overline{9}\} \times \{9\}$	$+ \{\overline{91}\} \times \{82\}$

$\{2(\overline{2};2)\} \rightarrow$

$\{\overline{2}\} \times \{2\}$
$+ \{\overline{3}\} \times \{3\}$
$+ \{\overline{32}\} \times \{5\}$
$+ \{\overline{4}\} \times \{4\}$
$+ \{\overline{42}\} \times \{42\}$
$+ \{\overline{43}\} \times \{61\}$
$+ \{\overline{5}\} \times \{5\}$
$+ \{\overline{51}\} \times \{6\}$
$+ \{\overline{52}\} \times \{7\}$
$+ \{\overline{54}\} \times \{63\}$
$+ \{\overline{6}\} \times \{51\}$
$+ \{\overline{61}\} \times \{61\}$
$+ \{\overline{62}\} \times \{62\}$
$+ \{\overline{63}\} \times \{63\}$
$+ \{\overline{64}\} \times \{73\}$
$+ \{\overline{7}\} \times \{7\}$
$+ \{\overline{71}\} \times \{8\}$
$+ \{\overline{72}\} \times \{81\}$
$+ \{\overline{73}\} \times \{73\}$
$+ \{\overline{8}\} \times \{71\}$
$+ \{\overline{81}\} \times \{81\}$
$+ \{\overline{82}\} \times \{82\}$
$+ \{\overline{9}\} \times \{81\}$
$+ \{\overline{91}\} \times \{91\}$
$+ \{\overline{10}\} \times \{10\}$

$+ \{\overline{21}\} \times \{3\}$
$+ \{\overline{31}\} \times \{31\}$
$+ \{\overline{3^2}\} \times \{51\}$
$+ \{\overline{41}\} \times \{32\}$
$+ \{\overline{42}\} \times \{51\}$
$+ \{\overline{4^2}\} \times \{62\}$
$+ \{\overline{51}\} \times \{3^2\}$
$+ \{\overline{52}\} \times \{43\}$
$+ \{\overline{53}\} \times \{53\}$
$+ \{\overline{54}\} \times \{72\}$
$+ \{\overline{6}\} \times \{6\}$
$+ \{\overline{61}\} \times \{7\}$
$+ \{\overline{62}\} \times \{71\}$
$+ \{\overline{63}\} \times \{72\}$
$+ \{\overline{64}\} \times \{82\}$
$+ \{\overline{71}\} \times \{53\}$
$+ \{\overline{72}\} \times \{54\}$
$+ \{\overline{72}\} \times \{9\}$
$+ \{\overline{73}\} \times \{82\}$
$+ \{\overline{8}\} \times \{8\}$
$+ \{\overline{81}\} \times \{9\}$
$+ \{\overline{82}\} \times \{91\}$
$+ \{\overline{9}\} \times \{9\}$
$+ \{\overline{91}\} \times \{10\}$

$+ \{\overline{2^2}\} \times \{4\}$
$+ \{\overline{31}\} \times \{4\}$
$+ \{\overline{4}\} \times \{2^2\}$
$+ \{\overline{41}\} \times \{41\}$
$+ \{\overline{42}\} \times \{6\}$
$+ \{\overline{5}\} \times \{32\}$
$+ \{\overline{51}\} \times \{42\}$
$+ \{\overline{52}\} \times \{52\}$
$+ \{\overline{53}\} \times \{62\}$
$+ \{\overline{5^2}\} \times \{73\}$
$+ \{\overline{61}\} \times \{43\}$
$+ \{\overline{62}\} \times \{4^2\}$
$+ \{\overline{62}\} \times \{8\}$
$+ \{\overline{63}\} \times \{81\}$
$+ \{\overline{7}\} \times \{52\}$
$+ \{\overline{71}\} \times \{62\}$
$+ \{\overline{72}\} \times \{63\}$
$+ \{\overline{73}\} \times \{5^2\}$
$+ \{\overline{73}\} \times \{91\}$
$+ \{\overline{81}\} \times \{63\}$
$+ \{\overline{82}\} \times \{64\}$
$+ \{\overline{82}\} \times \{10\}$
$+ \{\overline{91}\} \times \{73\}$
$+ \{\overline{10}\} \times \{82\}$

$+ \{\overline{3}\} \times \{21\}$
$+ \{\overline{32}\} \times \{41\}$
$+ \{\overline{4}\} \times \{31\}$
$+ \{\overline{41}\} \times \{5\}$
$+ \{\overline{43}\} \times \{52\}$
$+ \{\overline{5}\} \times \{41\}$
$+ \{\overline{51}\} \times \{51\}$
$+ \{\overline{52}\} \times \{61\}$
$+ \{\overline{53}\} \times \{71\}$
$+ \{\overline{6}\} \times \{42\}$
$+ \{\overline{61}\} \times \{52\}$
$+ \{\overline{62}\} \times \{53\}$
$+ \{\overline{63}\} \times \{54\}$
$+ \{\overline{64}\} \times \{64\}$
$+ \{\overline{7}\} \times \{61\}$
$+ \{\overline{71}\} \times \{71\}$
$+ \{\overline{72}\} \times \{72\}$
$+ \{\overline{73}\} \times \{64\}$
$+ \{\overline{8}\} \times \{62\}$
$+ \{\overline{81}\} \times \{72\}$
$+ \{\overline{82}\} \times \{73\}$
$+ \{\overline{9}\} \times \{72\}$
$+ \{\overline{91}\} \times \{82\}$
$+ \{\overline{10}\} \times \{91\}$

$\{2(\overline{3};3)\} \rightarrow$

$\{\overline{3}\} \times \{3\}$
$+ \{\overline{4}\} \times \{31\}$
$+ \{\overline{42}\} \times \{51\}$
$+ \{\overline{4^2}\} \times \{71\}$
$+ \{\overline{51}\} \times \{42\}$
$+ \{\overline{52}\} \times \{61\}$
$+ \{\overline{53}\} \times \{8\}$
$+ \{\overline{6}\} \times \{3^2\}$
$+ \{\overline{61}\} \times \{43\}$
$+ \{\overline{62}\} \times \{53\}$
$+ \{\overline{63}\} \times \{63\}$
$+ \{\overline{64}\} \times \{73\}$
$+ \{\overline{7}\} \times \{52\}$
$+ \{\overline{71}\} \times \{53\}$
$+ \{\overline{72}\} \times \{54\}$
$+ \{\overline{72}\} \times \{9\}$
$+ \{\overline{73}\} \times \{91\}$
$+ \{\overline{8}\} \times \{71\}$
$+ \{\overline{81}\} \times \{72\}$
$+ \{\overline{82}\} \times \{64\}$
$+ \{\overline{82}\} \times \{10\}$
$+ \{\overline{9}\} \times \{9\}$
$+ \{\overline{91}\} \times \{91\}$
$+ \{\overline{10}\} \times \{91\}$

$+ \{\overline{31}\} \times \{4\}$
$+ \{\overline{4}\} \times \{4\}$
$+ \{\overline{42}\} \times \{6\}$
$+ \{\overline{5}\} \times \{32\}$
$+ \{\overline{51}\} \times \{51\}$
$+ \{\overline{52}\} \times \{7\}$
$+ \{\overline{54}\} \times \{72\}$
$+ \{\overline{6}\} \times \{42\}$
$+ \{\overline{61}\} \times \{52\}$
$+ \{\overline{62}\} \times \{62\}$
$+ \{\overline{63}\} \times \{72\}$
$+ \{\overline{64}\} \times \{82\}$
$+ \{\overline{7}\} \times \{61\}$
$+ \{\overline{71}\} \times \{62\}$
$+ \{\overline{72}\} \times \{63\}$
$+ \{\overline{73}\} \times \{64\}$
$+ \{\overline{73}\} \times \{10\}$
$+ \{\overline{8}\} \times \{8\}$
$+ \{\overline{81}\} \times \{81\}$
$+ \{\overline{82}\} \times \{73\}$
$+ \{\overline{9}\} \times \{63\}$
$+ \{\overline{91}\} \times \{64\}$
$+ \{\overline{91}\} \times \{10\}$
$+ \{\overline{10}\} \times \{10\}$

$+ \{\overline{32}\} \times \{5\}$
$+ \{\overline{41}\} \times \{41\}$
$+ \{\overline{43}\} \times \{61\}$
$+ \{\overline{5}\} \times \{41\}$
$+ \{\overline{51}\} \times \{6\}$
$+ \{\overline{53}\} \times \{62\}$
$+ \{\overline{54}\} \times \{81\}$
$+ \{\overline{6}\} \times \{51\}$
$+ \{\overline{61}\} \times \{61\}$
$+ \{\overline{62}\} \times \{71\}$
$+ \{\overline{63}\} \times \{81\}$
$+ \{\overline{64}\} \times \{91\}$
$+ \{\overline{7}\} \times \{7\}$
$+ \{\overline{71}\} \times \{71\}$
$+ \{\overline{72}\} \times \{72\}$
$+ \{\overline{73}\} \times \{73\}$
$+ \{\overline{8}\} \times \{53\}$
$+ \{\overline{81}\} \times \{54\}$
$+ \{\overline{81}\} \times \{9\}$
$+ \{\overline{82}\} \times \{82\}$
$+ \{\overline{9}\} \times \{72\}$
$+ \{\overline{91}\} \times \{73\}$
$+ \{\overline{10}\} \times \{73\}$

$+ \{\overline{3^2}\} \times \{6\}$
$+ \{\overline{41}\} \times \{5\}$
$+ \{\overline{43}\} \times \{7\}$
$+ \{\overline{5}\} \times \{5\}$
$+ \{\overline{52}\} \times \{52\}$
$+ \{\overline{53}\} \times \{71\}$
$+ \{\overline{5^2}\} \times \{82\}$
$+ \{\overline{6}\} \times \{6\}$
$+ \{\overline{61}\} \times \{7\}$
$+ \{\overline{62}\} \times \{8\}$
$+ \{\overline{63}\} \times \{9\}$
$+ \{\overline{7}\} \times \{43\}$
$+ \{\overline{71}\} \times \{4^2\}$
$+ \{\overline{71}\} \times \{8\}$
$+ \{\overline{72}\} \times \{81\}$
$+ \{\overline{73}\} \times \{82\}$
$+ \{\overline{8}\} \times \{62\}$
$+ \{\overline{81}\} \times \{63\}$
$+ \{\overline{82}\} \times \{5^2\}$
$+ \{\overline{82}\} \times \{91\}$
$+ \{\overline{9}\} \times \{81\}$
$+ \{\overline{91}\} \times \{82\}$
$+ \{\overline{10}\} \times \{82\}$

$\{2(\overline{4};4)\} \rightarrow$

$\{\overline{4}\} \times \{4\}$ + $\{\overline{41}\} \times \{5\}$ + $\{\overline{42}\} \times \{6\}$ + $\{\overline{43}\} \times \{7\}$
+ $\{\overline{4^2}\} \times \{8\}$ + $\{\overline{5}\} \times \{41\}$ + $\{\overline{5}\} \times \{5\}$ + $\{\overline{51}\} \times \{51\}$
+ $\{\overline{51}\} \times \{6\}$ + $\{\overline{52}\} \times \{61\}$ + $\{\overline{52}\} \times \{7\}$ + $\{\overline{53}\} \times \{71\}$
+ $\{\overline{53}\} \times \{8\}$ + $\{\overline{54}\} \times \{81\}$ + $\{\overline{54}\} \times \{9\}$ + $\{\overline{5^2}\} \times \{91\}$
+ $\{\overline{6}\} \times \{42\}$ + $\{\overline{6}\} \times \{51\}$ + $\{\overline{6}\} \times \{6\}$ + $\{\overline{61}\} \times \{52\}$
+ $\{\overline{61}\} \times \{61\}$ + $\{\overline{61}\} \times \{7\}$ + $\{\overline{62}\} \times \{62\}$ + $\{\overline{62}\} \times \{71\}$
+ $\{\overline{62}\} \times \{8\}$ + $\{\overline{63}\} \times \{72\}$ + $\{\overline{63}\} \times \{81\}$ + $\{\overline{63}\} \times \{9\}$
+ $\{\overline{64}\} \times \{82\}$ + $\{\overline{64}\} \times \{91\}$ + $\{\overline{64}\} \times \{10\ \}$ + $\{\overline{7}\} \times \{43\}$
+ $\{\overline{7}\} \times \{52\}$ + $\{\overline{7}\} \times \{61\}$ + $\{\overline{7}\} \times \{7\}$ + $\{\overline{71}\} \times \{53\}$
+ $\{\overline{71}\} \times \{62\}$ + $\{\overline{71}\} \times \{71\}$ + $\{\overline{71}\} \times \{8\}$ + $\{\overline{72}\} \times \{63\}$
+ $\{\overline{72}\} \times \{72\}$ + $\{\overline{72}\} \times \{81\}$ + $\{\overline{72}\} \times \{9\}$ + $\{\overline{73}\} \times \{73\}$
+ $\{\overline{73}\} \times \{82\}$ + $\{\overline{73}\} \times \{91\}$ + $\{\overline{73}\} \times \{10\ \}$ + $\{\overline{8}\} \times \{4^2\}$
+ $\{\overline{8}\} \times \{53\}$ + $\{\overline{8}\} \times \{62\}$ + $\{\overline{8}\} \times \{71\}$ + $\{\overline{8}\} \times \{8\}$
+ $\{\overline{81}\} \times \{54\}$ + $\{\overline{81}\} \times \{63\}$ + $\{\overline{81}\} \times \{72\}$ + $\{\overline{81}\} \times \{81\}$
+ $\{\overline{81}\} \times \{9\}$ + $\{\overline{82}\} \times \{64\}$ + $\{\overline{82}\} \times \{73\}$ + $\{\overline{82}\} \times \{82\}$
+ $\{\overline{82}\} \times \{91\}$ + $\{\overline{82}\} \times \{10\ \}$ + $\{\overline{9}\} \times \{54\}$ + $\{\overline{9}\} \times \{63\}$
+ $\{\overline{9}\} \times \{72\}$ + $\{\overline{9}\} \times \{81\}$ + $\{\overline{9}\} \times \{9\}$ + $\{\overline{91}\} \times \{5^2\}$
+ $\{\overline{91}\} \times \{64\}$ + $\{\overline{91}\} \times \{73\}$ + $\{\overline{91}\} \times \{82\}$ + $\{\overline{91}\} \times \{91\}$
+ $\{\overline{10\ }\} \times \{10\ \}$ + $\{\overline{10\ }\} \times \{64\}$ + $\{\overline{10\ }\} \times \{73\}$ + $\{\overline{10\ }\} \times \{82\}$
+ $\{\overline{10\ }\} \times \{91\}$ + $\{\overline{10\ }\} \times \{10\ \}$

$\{2(\overline{5};5)\} \rightarrow$

$\{\overline{5}\} \times \{5\}$ + $\{\overline{51}\} \times \{6\}$ + $\{\overline{52}\} \times \{7\}$ + $\{\overline{53}\} \times \{8\}$
+ $\{\overline{54}\} \times \{9\}$ + $\{\overline{5^2}\} \times \{10\ \}$ + $\{\overline{6}\} \times \{51\}$ + $\{\overline{6}\} \times \{6\}$
+ $\{\overline{61}\} \times \{61\}$ + $\{\overline{61}\} \times \{7\}$ + $\{\overline{62}\} \times \{71\}$ + $\{\overline{62}\} \times \{8\}$
+ $\{\overline{63}\} \times \{81\}$ + $\{\overline{63}\} \times \{9\}$ + $\{\overline{64}\} \times \{91\}$ + $\{\overline{64}\} \times \{10\ \}$
+ $\{\overline{7}\} \times \{52\}$ + $\{\overline{7}\} \times \{61\}$ + $\{\overline{7}\} \times \{7\}$ + $\{\overline{71}\} \times \{62\}$
+ $\{\overline{71}\} \times \{71\}$ + $\{\overline{71}\} \times \{8\}$ + $\{\overline{72}\} \times \{72\}$ + $\{\overline{72}\} \times \{81\}$
+ $\{\overline{72}\} \times \{9\}$ + $\{\overline{73}\} \times \{82\}$ + $\{\overline{73}\} \times \{91\}$ + $\{\overline{73}\} \times \{10\ \}$
+ $\{\overline{8}\} \times \{53\}$ + $\{\overline{8}\} \times \{62\}$ + $\{\overline{8}\} \times \{71\}$ + $\{\overline{8}\} \times \{8\}$
+ $\{\overline{81}\} \times \{63\}$ + $\{\overline{81}\} \times \{72\}$ + $\{\overline{81}\} \times \{81\}$ + $\{\overline{81}\} \times \{9\}$
+ $\{\overline{82}\} \times \{73\}$ + $\{\overline{82}\} \times \{82\}$ + $\{\overline{82}\} \times \{91\}$ + $\{\overline{82}\} \times \{10\ \}$
+ $\{\overline{9}\} \times \{54\}$ + $\{\overline{9}\} \times \{63\}$ + $\{\overline{9}\} \times \{72\}$ + $\{\overline{9}\} \times \{81\}$
+ $\{\overline{9}\} \times \{9\}$ + $\{\overline{91}\} \times \{64\}$ + $\{\overline{91}\} \times \{73\}$ + $\{\overline{91}\} \times \{82\}$
+ $\{\overline{91}\} \times \{91\}$ + $\{\overline{91}\} \times \{10\ \}$ + $\{\overline{10\ }\} \times \{5^2\}$ + $\{\overline{10\ }\} \times \{64\}$
+ $\{\overline{10\ }\} \times \{73\}$ + $\{\overline{10\ }\} \times \{82\}$ + $\{\overline{10\ }\} \times \{91\}$ + $\{\overline{10\ }\} \times \{10\ \}$

$\{2(\overline{6};6)\} \rightarrow$

$\{\overline{6}\} \times \{6\}$ + $\{\overline{61}\} \times \{7\}$ + $\{\overline{62}\} \times \{8\}$ + $\{\overline{63}\} \times \{9\}$
+ $\{\overline{64}\} \times \{10\ \}$ + $\{\overline{7}\} \times \{61\}$ + $\{\overline{7}\} \times \{7\}$ + $\{\overline{71}\} \times \{71\}$
+ $\{\overline{71}\} \times \{8\}$ + $\{\overline{72}\} \times \{81\}$ + $\{\overline{72}\} \times \{9\}$ + $\{\overline{73}\} \times \{91\}$
+ $\{\overline{73}\} \times \{10\ \}$ + $\{\overline{8}\} \times \{62\}$ + $\{\overline{8}\} \times \{71\}$ + $\{\overline{8}\} \times \{8\}$
+ $\{\overline{81}\} \times \{72\}$ + $\{\overline{81}\} \times \{81\}$ + $\{\overline{81}\} \times \{9\}$ + $\{\overline{82}\} \times \{82\}$
+ $\{\overline{82}\} \times \{91\}$ + $\{\overline{82}\} \times \{10\ \}$ + $\{\overline{9}\} \times \{63\}$ + $\{\overline{9}\} \times \{72\}$
+ $\{\overline{9}\} \times \{81\}$ + $\{\overline{9}\} \times \{9\}$ + $\{\overline{91}\} \times \{73\}$ + $\{\overline{91}\} \times \{82\}$
+ $\{\overline{91}\} \times \{91\}$ + $\{\overline{91}\} \times \{10\ \}$ + $\{\overline{10\ }\} \times \{64\}$ + $\{\overline{10\ }\} \times \{73\}$
+ $\{\overline{10\ }\} \times \{82\}$ + $\{\overline{10\ }\} \times \{91\}$ + $\{\overline{10\ }\} \times \{10\ \}$

$\{2(\overline{7};7)\} \rightarrow$

$\{\overline{7}\} \times \{7\}$ $+ \{\overline{71}\} \times \{8\}$ $+ \{\overline{72}\} \times \{9\}$ $+ \{\overline{73}\} \times \{10\ \}$
$+ \{\overline{8}\} \times \{71\}$ $+ \{\overline{8}\} \times \{8\}$ $+ \{\overline{81}\} \times \{81\}$ $+ \{\overline{81}\} \times \{9\}$
$+ \{\overline{82}\} \times \{91\}$ $+ \{\overline{82}\} \times \{10\ \}$ $+ \{\overline{9}\} \times \{72\}$ $+ \{\overline{9}\} \times \{81\}$
$+ \{\overline{9}\} \times \{9\}$ $+ \{\overline{91}\} \times \{82\}$ $+ \{\overline{91}\} \times \{91\}$ $+ \{\overline{91}\} \times \{10\ \}$
$+ \{\overline{10\ }\} \times \{73\}$ $+ \{\overline{10\ }\} \times \{82\}$ $+ \{\overline{10\ }\} \times \{91\}$ $+ \{\overline{10\ }\} \times \{10\ \}$

$\{2(\overline{8};8)\} \rightarrow$

$\{\overline{8}\} \times \{8\}$ $+ \{\overline{81}\} \times \{9\}$ $+ \{\overline{82}\} \times \{10\ \}$ $+ \{\overline{9}\} \times \{81\}$
$+ \{\overline{9}\} \times \{9\}$ $+ \{\overline{91}\} \times \{91\}$ $+ \{\overline{91}\} \times \{10\ \}$ $+ \{\overline{10\ }\} \times \{82\}$
$+ \{\overline{10\ }\} \times \{91\}$ $+ \{\overline{10\ }\} \times \{10\ \}$

$\{2(\overline{9};9)\} \rightarrow$

$\{\overline{9}\} \times \{9\}$ $+ \{\overline{91}\} \times \{10\ \}$ $+ \{\overline{10\ }\} \times \{91\}$ $+ \{\overline{10\ }\} \times \{10\ \}$