Supplementary Material – S1

Details of the Employed Coupled Equations

The system of coupled chemical rate equations implemented in the PROCODA code to model the chemical evolution of HCOOH pure ice at 15 K under irradiation by cosmic ray analogs is presented below (variations of concentrations as a function of time). It includes 73 chemical species (4 observed and 69 non-observed in the experiments but expected) and 1631 (1558 + 73) reactions, covering processes such as radiation-induced dissociation, bimolecular, and desorption. A detailed explanation of these terms will be presented below. In these equations negative terms means consumption (or disappearing from ice) and positive terms means formation.

d[H]dt = (-des_H -2*r2 -r14 -r16 -r18 -r20 -r22 -r24 -r26 -r28 -r30 -r32 -r69 -r71 -r72 -r73 -r76 -r77 -r78 -r79 -r80 -r81 -r82 -r83 -r84 -r85 -r86 -r87 -r88 -r89 -r90 -r91 -r92 -r93 -r99 -r101 -r103 -r105 -r116 -r118 -r120 -r122 -r123 -r124 -r126 -r127 -r128 -r130 -r219 -r221 -r223 -r225 -r227 -r229 -r231 -r233 -r235 -r237 -r239 -r241 -r243 -r245 -r247 -r249 -r251 -r253 -r255 -r257 -r259 -r261 -r263 -r718 -r719 -r721 -r722 -r723 -r724 -r726 -r727 -r729 -r730 -r731 -r732 -r733 -r735 -r736 -r738 -r739 -r740 -r741 -r742 -r744 -r745 -r746 -r747 -r748 -r750 -r753 -r754 -r755 -r756 -r757 -r758 -r759 -r760 -r761 -r762 -r763 -r765 -r767 -r768 -r769 -r770 -r771 -r772 -r773 -r774 -r775 -r777 -r778 -r779 -r780 -r781 -r782 -r783 -r784 -r785 -r786 -r788 -r790 -r791 -r792 -r793 -r796 -r797 -r798 -r799 -r800 -r801 -r802 -r804 -r806 -r807 -r808 -r809 -r810 -r811 -r812 -r813 -r814 -r815 -r816 -r817 -r818 -r819 -r820 -r821 -r822 -r823 -r824 -r825 -r826 -r828 -r829 -r830 -r831 -r832 -r833 -r834 -r835 -r836 -r837 -r838 -r839 -r840 -r841 -r842 -r843 -r844 -r845 -r846 -r847 -r848 -r849 -r850 -r851 -r853 -r854 -r855 -r856 -r857 -r858 -r859 -r860 -r861 -r862 -r863 -r865 -r866 -r867 -r868 -r869 -r870 -r871 -r872 -r873 -r874 -r875 -r876 -r877 -r879 -r880 -r881 -r882 -r883 -r884 -r885 -r886 -r887 -r888 -r889 -r891 -r892 -r893 -r894 -r895 -r896 -r897 -r898 -r899 -r900 -r902 -r903 -r904 -r905 -r906 -r907 -r908 -r909 -r910 -r911 -r912 -r913 -r914 -r915 -r916 -r917 -r918 -r919 -r920 -r921 -r922 -r923 -r925 -r927 -r928 -r929 -r930 -r931 -r932 -r933 -r934 -r935 -r936 -r937 -r938 -r939 -r940 -r941 -r942 -r943 -r944 -r945 -r946 -r947 -r948 -r949 -r950 -r951 -r952 -r953 -r954 -r955 -r956 -r957 -r958 -r959 -r960 -r961 -r962 -r963 -r964 -r965 -r966 -r967 -r968 -r969 -r970 -r971 -r972 -r973 -r974 -r975 -r976 -r977 -r978 -r979 -r980 -r981 -r982 -r983 -r984 -r986 -r987 -r988 -r989 -r990 -r991 -r992 -r993 -r995 -r996 -r997 -r998 -r999 -r1000 -

r1001 -r1002 -r1003 -r1004 -r1005 -r1006 -r1007 -r1008 -r1009 -r1010 -r1011 -r1012 -r1013 -r1014 +2*r1 +r13 +r15 +r17 +r19 +r21 +r23 +r25 +r27 +r29 +r31 +r70 +r74 +r75 +r98 +r100 +r102 +r104 +r117 +r119 +r121 +r125 +r129 +r218 +r220 +r222 +r224 +r226 +r228 +r230 +r232 +r234 +r236 +r238 +r240 +r242 +r244 +r246 +r248 +r250 +r252 +r254 +r256 +r258 +r260 +r262 +r720 +r721 +r722 +r725 +r728 +r734 +r737 +r739 +r740 +r743 +r749 +r751 +r752 +r754 +r755 +r756 +r757 +r759 +r760 +r764 +r766 +r776 +r780 +r781 +r782 +r787 +r789 +r792 +r794 +r795 +r803 +r805 +r808 +r809 +r814 +r827 +r852 +r856 +r857 +r858 +r859 +r860 +r861 +r864 +r872 +r873 +r874 +r875 +r878 +r886 +r887 +r890 +r901 +r911 +r912 +r913 +r914 +r915 +r916 +r924 +r926 +r944 +r945 +r946 +r947 +r948 +r957 +r958 +r959 +r968 +r985 +r994)

d[H2]dt = (-des_H2 -r1 -r34 -r70 -r107 -r109 -r117 -r119 -r131 -r133 +r2 +r33 +r35 +r36 +r37 +r38 +r39 +r40 +r41 +r69 +r71 +r72 +r73 +r76 +r78 +r79 +r82 +r86 +r88 +r94 +r95 +r106 +r108 +r116 +r118 +r122 +r126 +r132 +r134 +r135 +r264 +r265 +r266 +r267 +r268 +r269 +r270 +r271 +r272 +r273 +r274 +r275 +r276 +r277 +r278 +r279 +r280 +r281 +r282 +r283 +r284 +r285 +r286 +r287 +r288 +r289 +r290 +r291 +r292 +r293 +r294 +r295 +r296 +r297 +r298 +r299 +r300 +r301 +r302 +r303 +r304 +r305 +r306 +r307 +r308 +r309 +r718 +r719 +r723 +r726 +r729 +r730 +r733 +r741 +r745 +r763 +r769 +r770 +r771 +r783 +r793 +r798 +r810 +r812 +r823 +r843 +r862 +r876 +r888 +r899 +r918 +r919 +r920 +r921 +r941 +r949 +r960 +r969 +r977 +r1015 +r1016 +r1017 +r1018 +r1019 +r1020 +r1021 +r1022 +r1023 +r1024 +r1025 +r1026 +r1027 +r1028 +r1029 +r1030 +r1031 +r1032 +r1033 +r1034 +r1035 +r1036 +r1037 +r1038 +r1039 +r1040 +r1041 +r1042 +r1043 +r1044 +r1045 +r1046 +r1047 +r1048)

d[C]dt = (-des_C -2*r4 -r6 -r7 -r14 -r34 -r43 -r45 -r70 -r74 -r75 -r94 -r95 -r96 -r97 -r142 -r144 -r146 -r148 -r150 -r152 -r154 -r156 -r183 -r184 -r186 -r188 -r189 -r190 -r191 -r192 -r193 -r195 -r196 -r197 -r198 -r199 -r200 -r311 -r313 -r315 -r320 -r322 -r324 -r326 -r328 -r734 -r751 -r764 -r827 -r1017 -r1022 -r1049 -r1051 -r1052 -r1054 -r1055 -r1056 -r1057 -r1058 -r1060 -r1063 -r1064 -r1065 -r1066 -r1067 -r1068 -r1069 -r1070 -r1071 -r1072 -r1075 -r1076 +2*r3 +r5 +r13 +r33 +r42 +r44 +r46 +r47 +r48 +r49 +r69 +r77 +r141 +r143 +r145 +r147 +r149 +r151 +r153 +r155 +r182 +r185 +r187 +r194 +r310 +r312 +r314 +r316 +r317 +r318 +r319 +r321 +r323 +r325 +r327 +r329 +r330 +r331 +r332 +r333 +r334 +r335 +r336 +r337 +r338 +r339 +r340 +r824 +r987 +r1050 +r1053 +r1059 +r1061 +r1062 +r1073 +r1074 +r1077 +r1078)

d[CH]dt = (-des_CH -r13 -r16 -r69 -r74 -r1050 +r14 +r15 +r35 +2*r50 +r51 +r52 +r53 +r54 +r55 +r56

+r70 +r71 +2*r96 +r97 +r341 +r342 +r343 +r344
+r345 +r346 +r347 +r348 +r349 +r350 +r351 +r352
+r353 +r354 +r355 +r356 +r357 +r358 +r359 +r360
+r361 +r362 +r363 +r364 +r365 +r366 +r367 +r368
+r746 +r799 +r828 +r991 +r1049 +r1051 +r1054
+r1056 +r1063 +r1066 +r1071 +r1075 +r1079 +r1080
+r1081 +r1082 +r1083 +r1084 +r1085 +r1086 +r1087
+r1088 +r1089 +r1090 +r1091 +r1092 +r1093 +r1094
+r1095 +r1096)

d[CH2]dt = (-des_CH2 -r15 -r18 -r33 -r43 -r71 -r94 -
r96 -r1053 -r1079 +r16 +r17 +r34 +r36 +r42 +r51
+2*r57 +r58 +r59 +r60 +r61 +r62 +r72 +r80 +r84
+r89 +r97 +r369 +r370 +r371 +r372 +r373 +r374
+r375 +r376 +r377 +r378 +r379 +r380 +r381 +r382
+r383 +r384 +r385 +r386 +r387 +r388 +r389 +r390
+r391 +r392 +r393 +r394 +r395 +r396 +r397 +r398
+r399 +r400 +r401 +r402 +r403 +r404 +r405 +r406
+r407 +r408 +r409 +r410 +r411 +r412 +r413 +r414
+r415 +r416 +r417 +r735 +r747 +r772 +r784 +r800
+r830 +r831 +r832 +r922 +r992 +r1052 +r1057
+r1067 +r1097 +r1098 +r1099 +r1100 +r1101 +r1102
+r1103 +r1104 +r1105 +r1106 +r1107 +r1108 +r1109
+r1110 +r1111 +r1112 +r1113 +r1114 +r1115 +r1116
+r1117 +r1118 +r1119 +r1120 +r1121 +r1122 +r1123
+r1124 +r1125 +r1126 +r1127 +r1128 +r1129 +r1130)

d[CH3]dt = (-des_CH3 -r17 -r20 -r35 -r45 -r72 -r75 -
r97 -r419 -r421 -r720 -r1015 -r1080 -r1097 +r18
+r19 +r44 +r52 +r58 +2*r63 +r64 +r65 +r66 +r73
+2*r81 +r83 +r87 +r90 +r92 +r418 +r420 +r422
+r423 +r424 +r425 +r426 +r427 +r428 +r429 +r430
+r431 +r432 +r433 +r434 +r435 +r436 +r437 +r438
+r439 +r440 +r441 +r442 +r443 +r444 +r731 +r742
+r748 +r773 +r774 +r785 +r801 +r815 +r819 +r863
+r877 +r889 +r900 +r950 +r951 +r961 +r962 +r970
+r971 +r978 +r979 +r993 +r1000 +r1001 +r1002
+r1131 +r1132 +r1133 +r1134 +r1135 +r1136 +r1137
+r1138 +r1139 +r1140 +r1141 +r1142 +r1143 +r1144
+r1145 +r1146 +r1147 +r1148 +r1149 +r1150 +r1151
+r1152 +r1153)

d[O]dt = (-des_O -2*r9 -r11 -r12 -r99 -r107 -r111 -
r113 -r117 -r121 -r129 -r132 -r135 -r136 -r138 -
r139 -r140 -r142 -r158 -r160 -r162 -r164 -r166 -
r168 -r170 -r182 -r185 -r187 -r194 -r201 -r202 -
r203 -r204 -r206 -r207 -r208 -r209 -r210 -r211 -
r212 -r213 -r214 -r215 -r216 -r217 -r419 -r421 -
r446 -r448 -r450 -r452 -r454 -r456 -r458 -r460 -
r462 -r464 -r466 -r468 -r470 -r472 -r474 -r476 -
r478 -r480 -r482 -r484 -r486 -r488 -r490 -r492 -
r494 -r496 -r498 -r500 -r502 -r504 -r506 -r508 -
r510 -r512 -r514 -r516 -r518 -r520 -r522 -r524 -
r526 -r528 -r720 -r725 -r728 -r737 -r743 -r749 -
r752 -r766 -r776 -r787 -r789 -r794 -r795 -r803 -
r805 -r852 -r864 -r878 -r890 -r901 -r924 -r926 -
r985 -r994 -r1015 -r1016 -r1018 -r1019 -r1020 -r1021
-r1023 -r1024 -r1025 -r1026 -r1027 -r1028 -r1029 -
r1030 -r1031 -r1032 -r1033 -r1034 -r1035 -r1036 -

r1037 -r1038 -r1039 -r1040 -r1041 -r1042 -r1043 -
r1044 -r1045 -r1046 -r1047 -r1048 -r1050 -r1053 -
r1059 -r1061 -r1062 -r1073 -r1074 -r1077 -r1078 -
r1079 -r1080 -r1081 -r1082 -r1083 -r1084 -r1085 -
r1086 -r1087 -r1088 -r1089 -r1090 -r1091 -r1092 -
r1093 -r1094 -r1095 -r1096 -r1097 -r1098 -r1099 -
r1100 -r1101 -r1102 -r1103 -r1104 -r1105 -r1106 -
r1107 -r1108 -r1109 -r1110 -r1111 -r1112 -r1113 -
r1114 -r1115 -r1116 -r1117 -r1118 -r1119 -r1120 -
r1121 -r1122 -r1123 -r1124 -r1125 -r1126 -r1127 -
r1128 -r1129 -r1130 -r1131 -r1132 -r1133 -r1134 -
r1135 -r1136 -r1137 -r1138 -r1139 -r1140 -r1141 -
r1142 -r1143 -r1144 -r1145 -r1146 -r1147 -r1148 -
r1149 -r1150 -r1151 -r1152 -r1153 -r1154 -r1155 -
r1156 -r1157 -r1158 -r1159 -r1160 -r1161 -r1162 -
r1163 -r1164 -r1165 -r1166 -r1167 -r1168 -r1169 -
r1170 -r1171 -r1172 -r1173 -r1174 -r1175 -r1176 -
r1177 -r1178 -r1179 -r1180 -r1181 -r1182 -r1183 -
r1184 -r1185 -r1186 -r1187 -r1188 -r1189 -r1190 -
r1191 -r1192 -r1193 -r1194 -r1195 -r1196 -r1197 -
r1198 -r1199 -r1200 -r1201 -r1202 -r1203 -r1204 -
r1205 -r1206 -r1207 -r1208 -r1209 -r1210 -r1211 -
r1212 -r1213 -r1214 -r1215 -r1216 -r1217 -r1218 -
r1219 -r1220 -r1221 -r1222 -r1223 -r1224 -r1225 -
r1226 -r1227 -r1228 -r1229 -r1230 -r1231 -r1232 -
r1233 -r1234 -r1235 -r1236 -r1237 -r1238 -r1239 -
r1240 -r1241 -r1242 -r1243 -r1244 -r1245 -r1246 -
r1247 -r1248 -r1249 -r1250 -r1251 -r1252 -r1253 -
r1254 -r1255 -r1256 -r1257 -r1258 -r1259 -r1260 -
r1261 -r1262 -r1263 -r1264 -r1265 -r1266 -r1267 -
r1268 -r1269 -r1270 -r1271 -r1272 -r1273 -r1274 -
r1275 -r1276 -r1277 -r1278 -r1279 -r1280 -r1281 -
r1282 -r1283 -r1284 -r1285 -r1286 -r1287 -r1288 -
r1289 -r1290 -r1291 -r1292 -r1293 -r1294 -r1295 -
r1296 -r1297 -r1298 -r1299 -r1300 -r1301 -r1302 -
r1303 -r1304 -r1305 -r1306 -r1307 -r1308 -r1309 -
r1310 -r1311 -r1312 -r1313 -r1314 -r1315 -r1316 -
r1317 -r1318 -r1319 -r1320 -r1321 -r1322 -r1323 -
r1324 -r1325 -r1326 -r1327 -r1328 -r1329 -r1330 -
r1331 -r1332 -r1333 -r1334 -r1335 -r1336 -r1337 -
r1338 -r1339 -r1340 -r1341 -r1342 -r1343 -r1344 -
r1345 -r1346 -r1347 -r1348 -r1349 -r1350 -r1351 -
r1352 -r1353 -r1354 -r1355 -r1356 -r1357 -r1358 -
r1359 -r1360 -r1361 -r1362 -r1363 -r1364 -r1365 -
r1366 -r1367 -r1368 -r1369 -r1370 -r1371 -r1372 -
r1373 -r1374 -r1375 -r1376 -r1377 -r1378 -r1379 -
r1380 -r1381 -r1382 -r1383 -r1384 -r1385 -r1386 -
r1387 -r1388 -r1389 -r1390 -r1391 -r1392 -r1393 -
r1394 -r1395 -r1396 -r1397 -r1398 -r1399 -r1400 -
r1401 -r1402 -r1403 -r1404 -r1405 -r1406 -r1407 -
r1408 -r1409 -r1410 -r1411 -r1412 -r1413 -r1414 -
r1415 -r1416 -r1417 -r1418 -r1419 -r1420 -r1421 -
r1422 -r1423 -r1424 -r1425 -r1426 -r1427 -r1428 -
r1429 -r1430 -r1431 -r1432 -r1433 -r1434 -r1435 -
r1436 -r1437 -r1438 -r1439 -r1440 -r1441 -r1442 -
r1443 -r1444 -r1445 -r1446 -r1447 -r1448 -r1449 -
r1450 -r1451 -r1452 -r1453 -r1454 -r1455 -r1456 -
r1457 -r1458 -r1459 -r1460 -r1461 -r1462 -r1463 -
r1464 -r1465 -r1466 -r1467 -r1468 -r1469 -r1470 -

r1471 -r1472 -r1473 -r1474 -r1475 -r1476 -r1477 -
r1478 -r1479 -r1480 -r1481 -r1482 -r1483 -r1484 -
r1485 -r1486 -r1487 -r1488 -r1489 -r1490 -r1491 -
r1492 -r1493 -r1494 -r1495 -r1496 -r1497 -r1498 -
r1499 -r1500 -r1501 -r1502 -r1503 -r1504 -r1505 -
r1506 -r1507 -r1508 -r1509 -r1510 -r1511 -r1512 -
r1513 -r1514 -r1515 -r1516 -r1517 -r1518 -r1519 -
r1520 -r1521 -r1522 -r1523 -r1524 -r1525 -r1526 -
r1527 -r1528 -r1529 -r1530 -r1531 -r1532 -r1533 -
r1534 -r1535 -r1536 -r1537 -r1538 -r1539 -r1540 -
r1541 -r1542 -r1543 -r1544 -r1545 -r1546 -r1547 -
r1548 -r1549 -r1550 -r1551 -r1552 -r1553 -r1554 -
r1555 -r1556 -r1557 -r1558 +2*r8 +r10 +r98 +r106
+r110 +r112 +r116 +r120 +r123 +r128 +r131 +r137
+r141 +r157 +r159 +r161 +r163 +r165 +r167 +r169
+r183 +r184 +r189 +r193 +r198 +r205 +r418 +r420
+r445 +r447 +r449 +r451 +r453 +r455 +r457 +r459
+r461 +r463 +r465 +r467 +r469 +r471 +r473 +r475
+r477 +r479 +r481 +r483 +r485 +r487 +r489 +r491
+r493 +r495 +r497 +r499 +r501 +r503 +r505 +r507
+r509 +r511 +r513 +r515 +r517 +r519 +r521 +r523
+r525 +r527 +r724 +r727 +r736 +r765 +r775 +r786
+r788 +r802 +r804 +r851 +r923 +r925 +r1049
+r1052 +r1058 +r1064 +r1068 +r1167 +r1168 +r1194
+r1195 +r1202 +r1203 +r1204 +r1205 +r1211 +r1212
+r1235 +r1236 +r1237 +r1239 +r1242 +r1243 +r1272
+r1331 +r1332 +r1333 +r1334 +r1335 +r1336 +r1346
+r1347 +r1348 +r1349 +r1359 +r1360 +r1379 +r1380
+r1381 +r1382 +r1401 +r1402 +r1450 +r1451 +r1452
+r1453 +r1454 +r1473 +r1474 +r1475 +r1494)

d[CH4]dt = (-des_CH4 -r19 -r36 -r73 -r725 -r728 -
r1016 +r20 +r46 +r53 +r59 +r67 +r68 +r77 +r80
+r83 +r85 +r91 +r93 +r529 +r530 +r531 +r532
+r533 +r534 +r535 +r536 +r537 +r538 +r539 +r540
+r541 +r542 +r543 +r544 +r545 +r546 +r547 +r548
+r549 +r550 +r551 +r552 +r553 +r554 +r555 +r556
+r557 +r558 +r559 +r560 +r561 +r562 +r563 +r724
+r727 +r732 +r777 +r816 +r820 +r833 +r834 +r865
+r879 +r891 +r902 +r927 +r928 +r929 +r1003
+r1156 +r1160 +r1164 +r1173 +r1179 +r1186 +r1206
+r1213 +r1218 +r1225 +r1244 +r1245 +r1246 +r1258
+r1259 +r1260 +r1383 +r1384 +r1385 +r1386 +r1403
+r1404 +r1405 +r1406 +r1421 +r1422 +r1423 +r1424
+r1455 +r1476 +r1495 +r1513)

d[OH]dt = (-des_OH -r98 -r101 -r111 -2*r115 -r116 -
r119 -r121 -2*r125 -2*r134 -2*r137 -r1049 +r99
+r100 +r110 +2*r114 +r117 +r118 +r120 +2*r124
+r127 +r130 +2*r133 +2*r136 +r138 +r139 +r369
+r370 +r422 +r564 +r565 +r566 +r567 +r568 +r569
+r570 +r571 +r572 +r573 +r574 +r575 +r576 +r577
+r578 +r579 +r580 +r581 +r582 +r583 +r584 +r585
+r586 +r587 +r588 +r589 +r590 +r732 +r744 +r750
+r753 +r767 +r778 +r790 +r796 +r806 +r835 +r853
+r866 +r867 +r868 +r880 +r881 +r882 +r892 +r893
+r894 +r903 +r904 +r905 +r930 +r942 +r988
+r1004 +r1005 +r1006 +r1050 +r1051 +r1055 +r1065
+r1069 +r1079 +r1097 +r1155 +r1157 +r1159 +r1161

+r1162 +r1165 +r1169 +r1171 +r1174 +r1175 +r1180
+r1185 +r1187 +r1196 +r1199 +r1222 +r1226 +r1227
+r1228 +r1238 +r1240 +r1241 +r1247 +r1261 +r1283
+r1304 +r1337 +r1350 +r1361 +r1370 +r1440 +r1441
+r1442 +r1443 +r1445 +r1456 +r1477 +r1496 +r1514)
d[H2O]dt = (-des_H2O -r100 -r106 -r113 -r118 -r132
-r136 -r1051 -r1052 +r101 +r107 +r112 +r119 +r123
+r127 +r131 +r137 +r140 +r341 +r342 +r371 +r591
+r592 +r593 +r594 +r595 +r596 +r597 +r598 +r599
+r600 +r601 +r602 +r603 +r604 +r605 +r606 +r607
+r608 +r609 +r610 +r611 +r612 +r613 +r614 +r615
+r616 +r617 +r618 +r619 +r731 +r738 +r758 +r761
+r762 +r768 +r779 +r791 +r797 +r807 +r811 +r813
+r817 +r818 +r821 +r822 +r825 +r836 +r844 +r846
+r847 +r917 +r931 +r932 +r933 +r943 +r952 +r963
+r972 +r980 +r1053 +r1060 +r1070 +r1080 +r1154
+r1158 +r1163 +r1166 +r1170 +r1172 +r1176 +r1188
+r1197 +r1200 +r1248 +r1249 +r1250 +r1262 +r1263
+r1264 +r1273 +r1274 +r1275 +r1278 +r1279 +r1280
+r1387 +r1407 +r1425 +r1446 +r1457 +r1458 +r1459
+r1460 +r1478 +r1479 +r1480 +r1481 +r1497 +r1498
+r1499 +r1500 +r1515 +r1516 +r1517 +r1518 +r1531)

d[C2]dt = (-des_C2 -r3 -r6 -r158 -r182 +r4 +r5 +2*r7
+r37 +r64 +r67 +r74 +r85 +r94 +r157 +r171 +r172
+r173 +r174 +r186 +r191 +r195 +r201 +r202 +r206
+r564 +r591 +r592 +r620 +r738 +r1055 +r1060
+r1072 +r1154 +r1181 +r1284)

d[CHCH]dt = (-des_CHCH -r22 -r37 -r42 -r50 -r95 -
r446 -r448 -r737 -r1018 -r1059 -r1081 -r1098 -r1154
+r21 +r38 +r43 +r54 +r60 +r65 +r75 +r76 +r84
+r87 +r91 +r445 +r447 +r593 +r594 +r595 +r621
+r622 +r623 +r624 +r625 +r626 +r627 +r628 +r629
+r736 +r744 +r750 +r826 +r837 +r1058 +r1155
+r1158 +r1177 +r1182 +r1189 +r1190 +r1207 +r1214
+r1219 +r1305 +r1306)

d[C2H3]dt = (-des_C2H3 -r21 -r24 -r44 -r51 -r76 -r77
-r743 -r749 -r1019 -r1061 -r1062 -r1082 -r1099 -
r1131 -r1155 +r22 +r23 +r39 +r45 +r47 +r55 +r61
+r78 +r90 +r565 +r566 +r567 +r630 +r631 +r632
+r633 +r634 +r635 +r636 +r637 +r638 +r758 +r761
+r762 +r838 +r839 +r1157 +r1178 +r1183 +r1191
+r1208 +r1215 +r1229 +r1287 +r1288 +r1289)

d[CO]dt = (-des_CO -r141 -r144 -r160 -r177 -r205 -
r219 +r142 +r143 +r159 +r171 +2*r175 +r176
+r178 +r179 +r182 +r183 +r186 +2*r188 +r190
+r192 +r196 +r199 +r201 +2*r203 +r204 +r207
+r208 +r210 +r212 +r215 +r218 +r264 +r343 +r372
+r373 +r529 +r530 +r531 +r568 +r596 +r597 +r598
+r639 +r640 +r641 +r642 +r643 +r644 +r645 +r646
+r647 +r648 +r649 +r650 +r651 +r718 +r735 +r742
+r748 +r753 +r768 +r826 +r829 +r840 +r854 +r986
+r989 +r1054 +r1057 +r1065 +r1070 +r1076 +r1098
+r1131 +r1156 +r1159 +r1163 +r1178 +r1184 +r1192
+r1209 +r1216 +r1220 +r1223 +r1285 +r1290 +r1307
+r1308 +r1532)

d[CH2CH2]dt = (-des_CH2CH2 -r23 -r26 -r38 -r46 -
r52 -r57 -r78 -r450 -r452 -r454 -r1020 -r1021 -
r1100 -r1132 -r1156 -r1157 -r1158 +r24 +r25 +r40
+r48 +r56 +r68 +r79 +r89 +r449 +r451 +r453
+r569 +r599 +r600 +r652 +r653 +r654 +r655 +r656
+r657 +r658 +r659 +r660 +r661 +r662 +r663 +r664
+r665 +r779 +r841 +r895 +r906 +r934 +r1161
+r1166 +r1184 +r1193 +r1210 +r1217 +r1221 +r1230
+r1251 +r1265 +r1291 +r1309 +r1310 +r1311 +r1388
+r1389 +r1408 +r1409 +r1426 +r1427)

d[HCO]dt = (-des_HCO -r218 -r221 -r311 -r456 -r718
-r752 -r1054 -r1055 -r1159 +r219 +r220 +r265 +r266
+r310 +r344 +r345 +r423 +r424 +r425 +r455 +r532
+r570 +r571 +r572 +r620 +r652 +r666 +r667 +r668
+r669 +r670 +r719 +r747 +r767 +r791 +r797 +r807
+r829 +r842 +r845 +r848 +r849 +r855 +r869 +r883
+r896 +r907 +r990 +r995 +r1015 +r1056 +r1064
+r1069 +r1072 +r1076 +r1081 +r1099 +r1132 +r1160
+r1162 +r1170 +r1172 +r1177 +r1183 +r1193
+2*r1198 +2*r1201 +r1224 +r1231 +r1286 +r1292
+r1293 +r1294 +r1312 +r1322 +r1323 +r1324 +r1533)

d[C2H5]dt = (-des_C2H5 -r25 -r28 -r39 -r53 -r58 -r79
-r80 -r81 -r458 -r1083 -r1101 -r1102 -r1133 -r1160 -
r1161 +r26 +r27 +r49 +r66 +r82 +r93 +r457 +r573
+r574 +r639 +r666 +r671 +r672 +r673 +r674 +r675
+r676 +r677 +r778 +r811 +r813 +r842 +r908 +r935
+r953 +r964 +r973 +r981 +r1007 +r1008 +r1165
+r1192 +r1232 +r1252 +r1266 +r1295 +r1313)

d[H2CO]dt = (-des_H2CO -r220 -r223 -r225 -r264 -
r313 -r315 -r460 -r462 -r464 -r719 -r734 -r766 -
r1017 -r1023 -r1056 -r1057 -r1058 -r1060 -r1162 -
r1163 +r221 +r222 +r224 +r312 +r314 +r374 +r375
+r376 +r426 +r459 +r461 +r463 +r533 +r534 +r601
+r602 +r630 +r653 +r678 +r679 +r680 +r681 +r682
+r683 +r684 +r685 +r686 +r687 +r688 +r720 +r723
+r726 +r746 +r765 +r777 +r790 +r796 +r806 +r841
+2*r850 +r870 +r871 +r884 +r885 +r897 +r898
+r909 +r910 +r936 +r996 +r1016 +r1059 +r1068
+r1082 +r1100 +r1133 +r1164 +r1169 +r1171 +r1176
+r1182 +r1191 +r1233 +r1234 +r1253 +r1267 +r1276
+r1281 +r1314 +r1315 +r1316 +r1325 +r1338 +r1339
+r1340 +r1351 +r1352 +r1353 +r1362 +r1363 +r1364
+r1371 +r1372 +r1373 +r1390 +r1391 +r1410 +r1411
+r1428 +r1429 +r1461 +r1462 +r1482 +r1483 +r1501
+r1502 +r1519 +r1520 +r1534)

d[CH3CH3]dt = (-des_CH3CH3 -r27 -r40 -r59 -r63 -
r82 -r83 -r466 -r468 -r776 -r1024 -r1025 -r1026 -
r1103 -r1134 -r1135 -r1164 -r1165 -r1166 +r28 +r62
+r92 +r465 +r467 +r640 +r678 +r689 +r690 +r691
+r692 +r693 +r694 +r695 +r775 +r840 +r845 +r937
+r954 +r965 +r974 +r982 +r1254 +r1268 +r1317
+r1392 +r1393 +r1394 +r1412 +r1413 +r1414 +r1430
+r1431 +r1432 +r1463 +r1484 +r1503 +r1521 +r1540)

d[CH2OH]dt = (-des_CH2OH -r222 -r265 -r341 -r369
-r418 -r721 -r723 -r724 -r787 -r794 -r803 -r1027 -
r1104 -r1136 -r1167 -r1169 -r1170 +r223 +r346 +r347
+r348 +r377 +r419 +r427 +r428 +r575 +r576 +r621
+r631 +r641 +r671 +r679 +2*r696 +2*r697 +2*r698
+2*r699 +r700 +r701 +r702 +r703 +r704 +r722
+r725 +r729 +r773 +r786 +r802 +r817 +r821 +r838
+r848 +r870 +r884 +r897 +r909 +2*r938 +r939
+r955 +r966 +r975 +r983 +r997 +r1009 +r1010
+r1061 +r1101 +r1134 +r1168 +r1174 +r1189 +r1233
+2*r1255 +r1256 +2*r1269 +r1270 +r1296 +r1297
+r1326 +r1395 +r1415 +r1433 +r1541)

d[CH3O]dt = (-des_CH3O -r224 -r266 -r342 -r370 -
r420 -r722 -r726 -r727 -r789 -r795 -r805 -r1028 -
r1084 -r1105 -r1137 -r1168 -r1171 -r1172 +r225
+r349 +r350 +r351 +r378 +r421 +r429 +r430 +r577
+r578 +r622 +r632 +r642 +r672 +r680 +r700 +r701
+r702 +r703 +2*r705 +2*r706 +2*r707 +2*r708
+r709 +r721 +r728 +r730 +r774 +r788 +r804 +r818
+r822 +r839 +r849 +r871 +r885 +r898 +r910 +r939
+2*r940 +r956 +r967 +r976 +r984 +r998 +r1011
+r1012 +r1062 +r1102 +r1135 +r1167 +r1175 +r1190
+r1234 +r1256 +2*r1257 +r1270 +2*r1271 +r1298
+r1299 +r1327 +r1396 +r1416 +r1434 +r1542)

d[O2]dt = (-des_O2 -r8 -r11 -r103 -r109 -r120 -r131
-r133 -r146 -r177 -r183 -r205 +r9 +r10 +2*r12
+r102 +r108 +r121 +r122 +r130 +r132 +r134 +r138
+r140 +r145 +r172 +r176 +r180 +r181 +r190 +r197
+r200 +r202 +r204 +r209 +r211 +r213 +r216 +r352
+r379 +r380 +r381 +r535 +r536 +r633 +r654 +r655
+r656 +r657 +r667 +r673 +r681 +r689 +r690 +r691
+r692 +r710 +r711 +r712 +r785 +r801 +r855 +r908
+r937 +r1063 +r1067 +r1136 +r1137 +r1173 +r1210
+r1217 +r1221 +r1224 +r1232 +r1254 +r1268 +r1277
+r1282 +r1300 +r1341 +r1342 +r1343 +r1354 +r1355
+r1356 +r1365 +r1366 +r1367 +r1374 +r1375 +r1376
+r1397 +r1417 +r1435 +r1444 +r1447 +r1464 +r1465
+r1485 +r1486 +r1504 +r1505 +r1522 +r1523 +r1543
+r1544 +r1545)

d[CH3OH]dt = (-des_CH3OH -r371 -r422 -r470 -r472
-r729 -r730 -r731 -r732 -r1029 -r1030 -r1031 -r1138
-r1173 -r1174 -r1175 -r1176 +r316 +r317 +r318
+r353 +r382 +r383 +r469 +r471 +r623 +r643 +r644
+r645 +r646 +r658 +r668 +r682 +r683 +r684 +r685
+r713 +r714 +r715 +r772 +r837 +r869 +r883 +r896
+r907 +r936 +r955 +r956 +r966 +r967 +r975 +r976
+r983 +r984 +r1013 +r1083 +r1103 +r1181 +r1209
+r1216 +r1220 +r1231 +r1253 +r1267 +r1277 +r1282
+r1301 +r1318 +r1319 +r1398 +r1399 +r1400 +r1418
+r1419 +r1420 +r1436 +r1437 +r1438 +r1466 +r1467
+r1468 +r1487 +r1488 +r1489 +r1506 +r1507 +r1508
+r1524 +r1525 +r1526 +r1546 +r1547 +r1548 +r1549)

d[HO2]dt = (-des_HO2 -r102 -r105 -r110 -r122 -r123
-r124 -r129 -r138 -r320 -r751 -r1063 -r1064 -r1065
+r103 +r104 +r111 +r125 +r126 +r128 +r139 +r319

+r354 +r355 +r356 +r431 +r432 +r624 +r634 +r635
+r636 +r637 +r647 +r659 +r669 +r674 +r675 +r676
+r677 +r716 +r784 +r800 +r816 +r820 +r854 +r895
+r906 +r935 +r954 +r965 +r974 +r982 +r999
+r1014 +r1066 +r1104 +r1105 +r1138 +r1208 +r1215
+r1223 +r1230 +r1252 +r1266 +r1302 +r1320 +r1328
+r1329 +r1439 +r1448 +r1469 +r1490 +r1509 +r1527)

d[H2O2]dt = (-des_H2O2 -r104 -r108 -r112 -r114 -
r126 -r127 -r135 -r139 -r140 -r322 -r324 -r326 -
r764 -r1022 -r1066 -r1067 -r1068 -r1069 -r1070 +r105
+r109 +r113 +r115 +r321 +r323 +r325 +r384 +r385
+r625 +r626 +r627 +r628 +r638 +r648 +r660 +r661
+r662 +r663 +r717 +r799 +r815 +r819 +r934 +r953
+r964 +r973 +r981 +r1084 +r1207 +r1214 +r1219
+r1229 +r1251 +r1265 +r1276 +r1281 +r1303 +r1321
+r1330 +r1344 +r1345 +r1357 +r1358 +r1368 +r1369
+r1377 +r1378 +r1449 +r1470 +r1471 +r1472 +r1491
+r1492 +r1493 +r1510 +r1511 +r1512 +r1528 +r1529
+r1530 +r1535)

d[C3]dt = (-des_C3 -r5 -r7 -r162 -r185 -r201 +r6
+r95 +r161 +r180 +r184 +r192 +r197 +r825)

d[C3H3]dt = (-des_C3H3 -r30 -r47 -r54 -r64 -r84 -r85
-r1085 -r1086 -r1106 -r1139 -r1177 -r1178 +r29 +r41
+r86 +r603 +r1180 +r1188 +r1303)

d[C2O]dt = (-des_C2O -r143 -r148 -r157 -r164 -r184
-r186 -r187 -r202 -r203 +r144 +r147 +r158 +r163
+r178 +r181 +r185 +r191 +r196 +r200 +r207 +r209
+r214 +r267 +r268 +r357 +r717 +r733 +r1017
+r1018 +r1071 +r1139 +r1179 +r1185 +r1197 +r1200
+r1286)

d[C3H4]dt = (-des_C3H4 -r29 -r32 -r48 -r55 -r60 -r67
-r86 -r87 -r1073 -r1074 -r1107 -r1108 -r1140 -r1179 -
r1180 -r1181 -r1182 -r1183 -r1184 +r30 +r31 +r88
+r579 +r604 +r836 +r1187 +r1302 +r1321)

d[C2OH]dt = (-des_C2OH -r227 -r229 -r310 -r328 -
r343 -r564 -r733 -r735 -r736 -r738 -r1071 -r1072 -
r1185 +r226 +r228 +r311 +r327 +r537 +r716 +r734
+r737 +r741 +r745 +r986 +r1019 +r1106 +r1140
+r1186 +r1196 +r1199 +r1285 +r1301 +r1330)

d[C3H5]dt = (-des_C3H5 -r31 -r41 -r49 -r56 -r61 -r65
-r88 -r89 -r90 -r91 -r474 -r1087 -r1088 -r1089 -
r1141 -r1142 -r1186 -r1187 -r1188 -r1189 -r1190 -
r1191 -r1192 -r1193 +r32 +r473 +r580 +r835 +r844
+r1300 +r1320)

d[H2CCO]dt = (-des_H2CCO -r226 -r267 -r312 -r344 -
r372 -r445 -r591 -r739 -r741 -r742 -r744 -r1032 -
r1194 -r1196 -r1197 -r1198 +r227 +r269 +r270 +r271
+r313 +r433 +r446 +r538 +r581 +r710 +r740 +r743
+r824 +r833 +r846 +r999 +r1020 +r1085 +r1107
+r1141 +r1195 +r1296 +r1298 +r1318 +r1328 +r1344
+r1357 +r1368 +r1377)

d[HCCOH]dt = (-des_HCCOH -r228 -r268 -r314 -r345
-r373 -r447 -r592 -r740 -r745 -r746 -r747 -r748 -
r750 -r1033 -r1195 -r1199 -r1200 -r1201 +r229 +r272
+r273 +r274 +r315 +r434 +r448 +r539 +r582 +r711
+r739 +r749 +r834 +r847 +r1021 +r1086 +r1108
+r1142 +r1194 +r1297 +r1299 +r1319 +r1329 +r1345
+r1358 +r1369 +r1378)

d[CO2]dt = (-des_CO2 -r145 -r150 -r159 -r166 -r188
-r204 -r231 -r753 +r146 +r149 +r160 +r165 +r173
+r179 +r187 +r189 +r195 +r199 +r205 +r206 +r208
+r211 +r214 +2*r217 +r230 +r275 +r276 +r277
+r435 +r540 +r541 +r542 +r543 +r583 +r605 +r686
+r751 +r752 +r763 +r828 +r853 +r917 +r990 +r997
+r998 +r1022 +r1023 +r1075 +r1206 +r1213 +r1218
+r1222 +r1295 +r1317 +r1326 +r1327 +r1439 +r1449
+r1536 +r1537 +r1538)

d[CH2CHOH]dt = (-des_CH2CHOH -r269 -r272 -r316 -
r346 -r349 -r374 -r423 -r449 -r476 -r478 -r480 -
r482 -r529 -r565 -r593 -r754 -r756 -r758 -r1077 -
r1110 -r1143 -r1202 -r1204 -r1206 -r1207 -r1208 -
r1209 -r1210 +r278 +r279 +r358 +r386 +r450 +r475
+r477 +r479 +r481 +r544 +r584 +r606 +r607 +r608
+r609 +r713 +r755 +r757 +r769 +r830 +r866 +r880
+r892 +r903 +r931 +r1024 +r1073 +r1087 +r1203
+r1205 +r1226 +r1248 +r1262 +r1292 +r1314 +r1341
+r1354 +r1365 +r1374 +r1398 +r1418 +r1436 +r1470
+r1491 +r1510 +r1528 +r1550 +r1551)

d[CH2OCH2]dt = (-des_CH2OCH2 -r270 -r273 -r317 -
r347 -r350 -r375 -r424 -r451 -r484 -r486 -r488 -
r490 -r530 -r566 -r594 -r755 -r759 -r761 -r1078 -
r1109 -r1111 -r1144 -r1203 -r1211 -r1213 -r1214 -
r1215 -r1216 -r1217 +r280 +r281 +r359 +r387 +r452
+r483 +r485 +r487 +r489 +r545 +r585 +r610 +r611
+r612 +r613 +r714 +r754 +r760 +r770 +r831 +r867
+r881 +r893 +r904 +r932 +r1025 +r1088 +r1202
+r1212 +r1227 +r1249 +r1263 +r1293 +r1315 +r1342
+r1355 +r1366 +r1375 +r1399 +r1419 +r1437 +r1471
+r1492 +r1511 +r1529 +r1552 +r1553)

d[CH3CHO]dt = (-des_CH3CHO -r271 -r274 -r318 -
r348 -r351 -r376 -r425 -r453 -r492 -r494 -r496 -
r498 -r531 -r567 -r595 -r757 -r760 -r762 -r1112 -
r1145 -r1205 -r1212 -r1218 -r1219 -r1220 -r1221
+r282 +r283 +r360 +r388 +r454 +r491 +r493 +r495
+r497 +r546 +r586 +r614 +r615 +r616 +r617 +r715
+r756 +r759 +r771 +r832 +r868 +r882 +r894 +r905
+r933 +r1026 +r1074 +r1089 +r1204 +r1211 +r1228
+r1250 +r1264 +r1294 +r1316 +r1343 +r1356 +r1367
+r1376 +r1400 +r1420 +r1438 +r1472 +r1493 +r1512
+r1530 +r1554 +r1555)
d[CH3CH2CH3]dt = (-des_CH3CH2CH3 -r62 -r66 -r68
-r92 -r93 -r500 -r502 +r499 +r501 +r712 +r1014
+r1397 +r1417 +r1435 +r1556)

d[HOCO]dt = (-des_HOCO -r230 -r233 -r235 -r237 -r319 -r352 -r455 -r504 -r568 -r763 -r765 -r767 -r768 -r827 -r852 -r1075 -r1076 -r1222 -r1223 -r1224 +r231 +r232 +r234 +r236 +r320 +r389 +r436 +r437 +r438 +r439 +r456 +r503 +r547 +r670 +r764 +r766 +r783 +r793 +r798 +r851 +r865 +r879 +r891 +r902 +r943 +r989 +r996 +r1027 +r1028 +r1143 +r1144 +r1145 +r1225 +r1238 +r1240 +r1241 +r1284 +r1291 +r1313 +r1325 +r1448 +2*r1539)

d[HOCHCH3]dt = (-des_HOCHCH3 -r239 -r241 -r353 -r377 -r378 -r426 -r457 -r506 -r532 -r569 -r769 -r770 -r771 -r772 -r773 -r774 -r775 -r777 -r778 -r779 -r864 -r878 -r890 -r901 -r1034 -r1090 -r1146 -r1147 -r1148 -r1225 -r1226 -r1227 -r1228 -r1229 -r1230 -r1231 -r1232 -r1233 -r1234 +r238 +r240 +r329 +r361 +r440 +r458 +r505 +r587 +r588 +r589 +r590 +r704 +r709 +r776 +r810 +r812 +r930 +r952 +r963 +r972 +r980 +r1013 +r1247 +r1261 +r1290 +r1312 +r1395 +r1396 +r1415 +r1416 +r1433 +r1434 +r1444 +r1469 +r1490 +r1509 +r1527)

d[CH2OO]dt = (-des_CH2OO -r232 -r275 -r321 -r354 -r379 -r459 -r570 -r596 -r780 -r781 -r783 -r784 -r785 -r786 -r788 -r790 -r791 -r1235 -r1236 -r1238 +r233 +r284 +r285 +r322 +r362 +r390 +r391 +r392 +r393 +r441 +r460 +r548 +r549 +r550 +r551 +r649 +r693 +r782 +r787 +r789 +r927 +r1029 +r1109 +r1146 +r1237 +r1244 +r1258 +r1273 +r1278 +r1287 +r1309 +r1322 +r1338 +r1351 +r1362 +r1371 +r1392 +r1412 +r1430 +r1466 +r1487 +r1506 +r1524 +r1536 +r1557 +r1558)

d[HCOOH]dt = (-des_HCOOH -r234 -r276 -r323 -r355 -r380 -r461 -r571 -r597 -r793 -r796 -r797 -r1240 +r235 +r286 +r287 +r324 +r363 +r394 +r395 +r396 +r397 +r442 +r462 +r552 +r553 +r554 +r555 +r650 +r694 +r780 +r792 +r794 +r795 +r863 +r877 +r889 +r900 +r928 +r942 +r995 +r1030 +r1110 +r1111 +r1112 +r1147 +r1235 +r1239 +r1245 +r1259 +r1274 +r1279 +r1288 +r1310 +r1323 +r1339 +r1352 +r1363 +r1372 +r1393 +r1413 +r1431 +r1447 +r1467 +r1488 +r1507 +r1525 +r1537)

d[H2CO2]dt = (-des_H2CO2 -r236 -r277 -r325 -r356 -r381 -r463 -r572 -r598 -r782 -r792 -r798 -r799 -r800 -r801 -r802 -r804 -r806 -r807 -r1237 -r1239 -r1241 +r237 +r288 +r289 +r326 +r364 +r398 +r399 +r400 +r401 +r443 +r464 +r556 +r557 +r558 +r559 +r651 +r695 +r781 +r803 +r805 +r929 +r1031 +r1148 +r1236 +r1246 +r1260 +r1275 +r1280 +r1289 +r1311 +r1324 +r1340 +r1353 +r1364 +r1373 +r1394 +r1414 +r1432 +r1468 +r1489 +r1508 +r1526 +r1538)

d[CH3CH2OH]dt = (-des_CH3CH2OH -r238 -r278 -r280 -r282 -r382 -r427 -r429 -r465 -r508 -r510 -r512 -r514 -r533 -r573 -r599 -r808 -r810 -r811 -r924 -r1035 -r1037 -r1039 -r1041 -r1113 -r1242 -r1244 -r1245 -r1246 -r1247 -r1248 -r1249 -r1250 -r1251 -r1252 -r1253 -r1254 -r1255 -r1256 -r1257 +r239 +r330 +r402 +r466 +r507 +r509 +r511 +r513 +r687 +r809 +r923 +r1009 +r1011 +r1243 +r1307

+r1390 +r1410 +r1428 +r1464 +r1485 +r1504 +r1522 +r1557)

d[CH3OCH3]dt = (-des_CH3OCH3 -r240 -r279 -r281 -r283 -r383 -r428 -r430 -r467 -r516 -r518 -r520 -r522 -r534 -r574 -r600 -r809 -r812 -r813 -r926 -r1036 -r1038 -r1040 -r1042 -r1114 -r1115 -r1243 -r1258 -r1259 -r1260 -r1261 -r1262 -r1263 -r1264 -r1265 -r1266 -r1267 -r1268 -r1269 -r1270 -r1271 +r241 +r331 +r403 +r468 +r515 +r517 +r519 +r521 +r688 +r808 +r925 +r1010 +r1012 +r1242 +r1308 +r1391 +r1411 +r1429 +r1465 +r1486 +r1505 +r1523 +r1558)

d[O3]dt = (-des_O3 -r10 -r12 -r128 -r130 -r152 -r189 -r190 +r11 +r129 +r135 +r151 +r174 +r210 +r365 +r404 +r629 +r1463 +r1484 +r1503 +r1521 +r1556)

d[CH2OHOH]dt = (-des_CH2OHOH -r284 -r286 -r288 -r384 -r431 -r469 -r535 -r575 -r577 -r601 -r815 -r816 -r817 -r818 -r1043 -r1273 -r1274 -r1275 -r1276 -r1277 +r332 +r333 +r334 +r335 +r366 +r405 +r406 +r407 +r408 +r470 +r664 +r814 +r922 +r950 +r961 +r970 +r978 +r1007 +r1077 +r1078 +r1090 +r1113 +r1114 +r1272 +r1305 +r1388 +r1408 +r1426 +r1461 +r1482 +r1501 +r1519 +r1550 +r1552 +r1554)

d[CH3OOH]dt = (-des_CH3OOH -r285 -r287 -r289 -r385 -r432 -r471 -r536 -r576 -r578 -r602 -r814 -r819 -r820 -r821 -r822 -r1044 -r1272 -r1278 -r1279 -r1280 -r1281 -r1282 +r336 +r337 +r338 +r339 +r367 +r409 +r410 +r411 +r412 +r472 +r665 +r951 +r962 +r971 +r979 +r1008 +r1115 +r1306 +r1389 +r1409 +r1427 +r1462 +r1483 +r1502 +r1520 +r1551 +r1553 +r1555)

d[C3O]dt = (-des_C3O -r147 -r161 -r168 -r171 -r191 -r192 -r194 -r206 -r207 +r148 +r162 +r167 +r193 +r213 +r823 +r1283)

d[C3OH]dt = (-des_C3OH -r327 -r357 -r620 -r823 -r824 -r825 -r826 -r985 -r1091 -r1283 -r1284 -r1285 -r1286 +r328)

d[C2O2]dt = (-des_C2O2 -r149 -r154 -r163 -r170 -r172 -r175 -r193 -r195 -r196 -r197 -r208 -r209 -r828 -r829 +r150 +r153 +r164 +r169 +r194 +r198 +r212 +r216 +r618 +r827 +r988 +r1032 +r1033 +r1091 +r1535)

d[CH3COCH2]dt = (-des_CH3COCH2 -r243 -r329 -r358 -r359 -r360 -r433 -r434 -r473 -r537 -r579 -r603 -r621 -r622 -r630 -r639 -r652 -r830 -r831 -r832 -r833 -r834 -r835 -r836 -r837 -r838 -r839 -r840 -r841 -r842 -r1092 -r1093 -r1094 -r1095 -r1116 -r1287 -r1288 -r1289 -r1290 -r1291 -r1292 -r1293 -r1294 -r1295 -r1296 -r1297 -r1298 -r1299 -r1300 -r1301 -r1302 -r1303 +r242 +r474 +r843 +r1304)

d[CH3COCH3]dt = (-des_CH3COCH3 -r242 -r330 -r331 -r361 -r386 -r387 -r388 -r538 -r539 -r580 -r604 -r623 -r631 -r632 -r640 -r653 -r666 -r843 -r844 -r845 -r1117 -r1118 -r1119 -r1120 -r1149 -r1304 -r1305 -r1306 -r1307 -r1308 -r1309 -r1310 -r1311 -r1312 -r1313 -r1314 -r1315 -r1316 -r1317 -r1318 -r1319 -r1320 -r1321 +r243 +r290 +r619 +r1387 +r1407 +r1425)

d[C2H3O2]dt = (-des_C2H3O2 -r362 -r363 -r364 -r389 -r435 -r581 -r582 -r624 -r633 -r641 -r642 -r846 -r847 -r848 -r849 -r850 -r994 -r1096 -r1121 -r1150 -r1322 -r1323 -r1324 -r1325 -r1326 -r1327 -r1328 -r1329 -r1330 +r291 +r862 +r876 +r888 +r899 +r1034 +r1116 +r1149 +r1337 +r1350 +r1361 +r1370)

d[CO3]dt = (-des_CO3 -r151 -r156 -r165 -r176 -r198 -r199 -r200 -r210 -r211 -r245 -r851 -r853 -r854 -r855 +r152 +r155 +r166 +r177 +r215 +r244 +r292 +r413 +r852 +r993 +r1150 +r1446 +r1534)

d[CH3COOH]dt = (-des_CH3COOH -r247 -r332 -r336 -r390 -r394 -r398 -r436 -r475 -r483 -r491 -r540 -r625 -r634 -r643 -r654 -r856 -r858 -r860 -r862 -r863 -r865 -r866 -r867 -r868 -r869 -r870 -r871 -r1045 -r1331 -r1333 -r1335 -r1337 -r1338 -r1339 -r1340 -r1341 -r1342 -r1343 -r1344 -r1345 +r246 +r293 +r294 +r295 +r296 +r476 +r484 +r492 +r560 +r857 +r859 +r861 +r864 +r918 +r1035 +r1036 +r1092 +r1117 +r1332 +r1334 +r1336 +r1383 +r1403 +r1421 +r1440 +r1457 +r1478 +r1497 +r1515 +r1546)

d[HCOOCH3]dt = (-des_HCOOCH3 -r249 -r333 -r337 -r391 -r395 -r399 -r437 -r477 -r485 -r493 -r541 -r626 -r635 -r644 -r655 -r857 -r872 -r874 -r876 -r877 -r879 -r880 -r881 -r882 -r883 -r884 -r885 -r1046 -r1332 -r1346 -r1348 -r1350 -r1351 -r1352 -r1353 -r1354 -r1355 -r1356 -r1357 -r1358 +r248 +r297 +r298 +r299 +r300 +r478 +r486 +r494 +r561 +r856 +r873 +r875 +r878 +r919 +r1037 +r1038 +r1093 +r1118 +r1331 +r1347 +r1349 +r1384 +r1404 +r1422 +r1441 +r1458 +r1479 +r1498 +r1516 +r1547)

d[OHCH2CHO]dt = (-des_OHCH2CHO -r251 -r334 -r338 -r392 -r396 -r400 -r438 -r479 -r487 -r495 -r542 -r627 -r636 -r645 -r656 -r859 -r873 -r886 -r888 -r889 -r891 -r892 -r893 -r894 -r895 -r896 -r897 -r898 -r1047 -r1334 -r1347 -r1359 -r1361 -r1362 -r1363 -r1364 -r1365 -r1366 -r1367 -r1368 -r1369 +r250 +r301 +r302 +r303 +r304 +r480 +r488 +r496 +r562 +r858 +r872 +r887 +r890 +r920 +r1039 +r1040 +r1094 +r1119 +r1333 +r1346 +r1360 +r1385 +r1405 +r1423 +r1442 +r1459 +r1480 +r1499 +r1517 +r1548)

d[OHCHCHOH]dt = (-des_OHCHCHOH -r253 -r335 -r339 -r393 -r397 -r401 -r439 -r481 -r489 -r497 -r543 -r628 -r637 -r646 -r657 -r861 -r875 -r887 -r899 -r900 -r902 -r903 -r904 -r905 -r906 -r907 -

r908 -r909 -r910 -r1048 -r1336 -r1349 -r1360 -r1370 -r1371 -r1372 -r1373 -r1374 -r1375 -r1376 -r1377 -r1378 +r252 +r305 +r306 +r307 +r308 +r482 +r490 +r498 +r563 +r860 +r874 +r886 +r901 +r921 +r1041 +r1042 +r1095 +r1120 +r1335 +r1348 +r1359 +r1386 +r1406 +r1424 +r1443 +r1460 +r1481 +r1500 +r1518 +r1549)

d[CH3CHOHCH3]dt = (-des_CH3CHOHCH3 -r499 -r524 -r911 -r913 -r1122 -r1125 -r1128 -r1151 -r1379 -r1381 -r1383 -r1384 -r1385 -r1386 -r1387 -r1388 -r1389 -r1390 -r1391 -r1392 -r1393 -r1394 -r1395 -r1396 -r1397 -r1398 -r1399 -r1400 +r500 +r523 +r912 +r914 +r1004 +r1380 +r1382 +r1543)

d[CH3OCH2CH3]dt = (-des_CH3OCH2CH3 -r501 -r526 -r912 -r915 -r1123 -r1126 -r1129 -r1152 -r1380 -r1401 -r1403 -r1404 -r1405 -r1406 -r1407 -r1408 -r1409 -r1410 -r1411 -r1412 -r1413 -r1414 -r1415 -r1416 -r1417 -r1418 -r1419 -r1420 +r502 +r525 +r911 +r916 +r1005 +r1379 +r1402 +r1544)

d[CH3CH2CH2OH]dt = (-des_CH3CH2CH2OH -r290 -r402 -r403 -r440 -r528 -r544 -r545 -r546 -r658 -r671 -r672 -r678 -r914 -r916 -r1124 -r1127 -r1130 -r1153 -r1382 -r1402 -r1421 -r1422 -r1423 -r1424 -r1425 -r1426 -r1427 -r1428 -r1429 -r1430 -r1431 -r1432 -r1433 -r1434 -r1435 -r1436 -r1437 -r1438 +r527 +r913 +r915 +r1006 +r1381 +r1401 +r1545)

d[HCO3]dt = (-des_HCO3 -r244 -r255 -r365 -r503 -r583 -r647 -r667 -r917 -r1439 +r245 +r254 +r368 +r504 +r941 +r987 +r992 +r1121 +r1445 +r1533)

d[CH3OCHOH]dt = (-des_CH3OCHOH -r246 -r248 -r250 -r252 -r257 -r259 -r261 -r263 -r291 -r366 -r367 -r441 -r442 -r443 -r505 -r547 -r584 -r585 -r586 -r638 -r659 -r668 -r673 -r679 -r680 -r918 -r919 -r920 -r921 -r922 -r923 -r925 -r927 -r928 -r929 -r930 -r931 -r932 -r933 -r934 -r935 -r936 -r937 -r938 -r939 -r940 -r1440 -r1441 -r1442 -r1443 -r1444 +r247 +r249 +r251 +r253 +r256 +r258 +r260 +r262 +r444 +r506 +r924 +r926 +r949 +r960 +r969 +r977 +r1003 +r1151 +r1152 +r1153 +r1456 +r1477 +r1496 +r1514 +r1541 +r1542)

d[H2CO3]dt = (-des_H2CO3 -r254 -r292 -r404 -r605 -r648 -r669 -r681 -r941 -r942 -r943 -r1445 -r1446 -r1447 -r1448 -r1449 +r255 +r340 +r991 +r1043 +r1044 +r1096 +r1455 +r1476 +r1495 +r1513 +r1532 +r1540)

d[CH3CHOHOH]dt = (-des_CH3CHOHOH -r256 -r293 -r297 -r301 -r305 -r405 -r409 -r507 -r515 -r548 -r552 -r556 -r587 -r606 -r610 -r614 -r660 -r674 -r682 -r689 -r696 -r700 -r705 -r944 -r947 -r949 -r950 -r951 -r952 -r953 -r954 -r955 -r956 -r1450 -r1453 -r1455 -r1456 -r1457 -r1458 -r1459 -r1460 -r1461 -r1462 -r1463 -r1464 -r1465 -r1466 -r1467 -r1468 -r1469 -r1470 -r1471 -r1472 +r257 +r414 +r508

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+r516 +r945 +r946 +r948 +r1000 +r1122 +r1123
+r1124 +r1451 +r1452 +r1454)

d[CH3OCH2OH]dt = (-des_CH3OCH2OH -r258 -r294 -
r298 -r302 -r306 -r406 -r410 -r509 -r517 -r549 -
r553 -r557 -r588 -r607 -r611 -r615 -r661 -r675 -
r683 -r690 -r697 -r701 -r706 -r945 -r958 -r960 -
r961 -r962 -r963 -r964 -r965 -r966 -r967 -r1451 -
r1474 -r1476 -r1477 -r1478 -r1479 -r1480 -r1481 -
r1482 -r1483 -r1484 -r1485 -r1486 -r1487 -r1488 -
r1489 -r1490 -r1491 -r1492 -r1493 +r259 +r415 +r510
+r518 +r944 +r957 +r959 +r1001 +r1125 +r1126
+r1127 +r1450 +r1473 +r1475)

d[CH3OOCH3]dt = (-des_CH3OOCH3 -r260 -r295 -
r299 -r303 -r307 -r407 -r411 -r511 -r519 -r550 -
r554 -r558 -r589 -r608 -r612 -r616 -r662 -r676 -
r684 -r691 -r698 -r702 -r707 -r946 -r957 -r968 -
r969 -r970 -r971 -r972 -r973 -r974 -r975 -r976 -
r1452 -r1473 -r1494 -r1495 -r1496 -r1497 -r1498 -
r1499 -r1500 -r1501 -r1502 -r1503 -r1504 -r1505 -
r1506 -r1507 -r1508 -r1509 -r1510 -r1511 -r1512
+r261 +r416 +r512 +r520)

d[HOCH2CH2OH]dt = (-des_HOCH2CH2OH -r262 -r296
-r300 -r304 -r308 -r408 -r412 -r513 -r521 -r551 -
r555 -r559 -r590 -r609 -r613 -r617 -r663 -r677 -
r685 -r692 -r699 -r703 -r708 -r948 -r959 -r977 -
r978 -r979 -r980 -r981 -r982 -r983 -r984 -r1454 -
r1475 -r1513 -r1514 -r1515 -r1516 -r1517 -r1518 -
r1519 -r1520 -r1521 -r1522 -r1523 -r1524 -r1525 -
r1526 -r1527 -r1528 -r1529 -r1530 +r263 +r417 +r514
+r522 +r947 +r958 +r968 +r1002 +r1128 +r1129
+r1130 +r1453 +r1474 +r1494)

d[C3O2]dt = (-des_C3O2 -r153 -r167 -r173 -r178 -
r180 -r212 -r213 -r214 -r986 +r154 +r168 +r985)

d[C2O3]dt = (-des_C2O3 -r155 -r169 -r174 -r179 -
r181 -r215 -r216 -r217 -r987 -r988 -r989 -r990
+r156 +r170 +r309 +r1531)

d[OHCCOOH]dt = (-des_OHCCOOH -r309 -r340 -r368
-r413 -r618 -r629 -r649 -r650 -r651 -r670 -r686 -
r710 -r711 -r716 -r717 -r991 -r992 -r993 -r995 -
r996 -r997 -r998 -r999 -r1531 -r1532 -r1533 -r1534 -
r1535 -r1536 -r1537 -r1538 -r1539 +r994 +r1045
+r1046 +r1047 +r1048)

d[CH3CH2CHOHOH]dt = (-des_CH3CH2CHOHOH -r414
-r415 -r416 -r417 -r444 -r523 -r525 -r527 -r560 -
r561 -r562 -r563 -r619 -r664 -r665 -r687 -r688 -
r693 -r694 -r695 -r704 -r709 -r712 -r713 -r714 -
r715 -r1000 -r1001 -r1002 -r1003 -r1004 -r1005 -
r1006 -r1007 -r1008 -r1009 -r1010 -r1011 -r1012 -
r1013 -r1014 -r1540 -r1541 -r1542 -r1543 -r1544 -
r1545 -r1546 -r1547 -r1548 -r1549 -r1550 -r1551 -
r1552 -r1553 -r1554 -r1555 -r1556 -r1557 -r1558
+r524 +r526 +r528)

The following list (presented as compact as possible) is the reaction rates employed in the code. It worth noting that in this list, each element in the vector y = ['y[0]', 'y[1]', 'y[2]', 'y[3]', 'y[4]', 'y[5]', 'y[6]', 'y[7]', 'y[8]', 'y[9]', 'y[10]', 'y[11]', 'y[12]', 'y[13]', 'y[14]', 'y[15]', 'y[16]', 'y[17]', 'y[18]', 'y[19]', 'y[20]', 'y[21]', 'y[22]', 'y[23]', 'y[24]', 'y[25]', 'y[26]', 'y[27]', 'y[28]', 'y[29]', 'y[30]', 'y[31]', 'y[32]', 'y[33]', 'y[34]', 'y[35]', 'y[36]', 'y[37]', 'y[38]', 'y[39]', 'y[40]', 'y[41]', 'y[42]', 'y[43]', 'y[44]', 'y[45]', 'y[46]', 'y[47]', 'y[48]', 'y[49]', 'y[50]', 'y[51]', 'y[52]', 'y[53]', 'y[54]', 'y[55]', 'y[56]', 'y[57]', 'y[58]', 'y[59]', 'y[60]', 'y[61]', 'y[62]', 'y[63]', 'y[64]', 'y[65]', 'y[66]', 'y[67]', 'y[68]', 'y[69]', 'y[70]', 'y[71]', 'y[72]'] represents a given molecular concentration in the vector concentration = ['[H]', '[H2]', '[C]', '[CH]', '[CH2]', '[CH3]', '[O]', '[CH4]', '[OH]', '[H2O]', '[C2]', '[CHCH]', '[C2H3]', '[CO]', '[CH2CH2]', '[HCO]', '[C2H5]', '[H2CO]', '[CH3CH3]', '[CH2OH]', '[CH3O]', '[O2]', '[CH3OH]', '[HO2]', '[H2O2]', '[C3]', '[C3H3]', '[C2O]', '[C3H4]', '[C2OH]', '[C3H5]', '[H2CCO]', '[HCCOH]', '[CO2]', '[CH2CHOH]', '[CH2OCH2]', '[CH3CHO]', '[CH3CH2CH3]', '[HOCO]', '[HOCHCH3]', '[CH2OO]', '[HCOOH]', '[H2CO2]', '[CH3CH2OH]', '[CH3OCH3]', '[O3]', '[CH2OHOH]', '[CH3OOH]', '[C3O]', '[C3OH]', '[C2O2]', '[CH3COCH2]', '[CH3COCH3]', '[C2H3O2]', '[CO3]', '[CH3COOH]', '[HCOOCH3]', '[OHCH2CHO]', '[OHCHCHOH]', '[CH3CHOHCH3]', '[CH3OCH2CH3]', '[CH3CH2CH2OH]', '[HCO3]', '[CH3OCHOH]', '[H2CO3]', '[CH3CHOHOH]', '[CH3OCH2OH]', '[CH3OOCH3]', '[HOCH2CH2OH]', '[C3O2]', '[C2O3]', '[OHCCOOH]', '[CH3CH2CHOHOH]']. The variable r represents the reaction rate, k denotes the rate coefficient (also named in the code as effective rate coefficient (ERC) of the reaction, while L represents the ice thickness.

r1 = k1 * y[1]
r2 = k2 * y[0] * y[0] / L
r3 = k3 * y[10]
r4 = k4 * y[2] * y[2] / L
r5 = k5 * y[25]
r6 = k6 * y[2] * y[10] / L
r7 = k7 * y[2] * y[25] / L
r8 = k8 * y[21]
r9 = k9 * y[6] * y[6] / L
r10 = k10 * y[45]
r11 = k11 * y[6] * y[21] / L
r12 = k12 * y[6] * y[45] / L
r13 = k13 * y[3]
r14 = k14 * y[0] * y[2] / L
r15 = k15 * y[4]
r16 = k16 * y[0] * y[3] / L
r17 = k17 * y[5]
r18 = k18 * y[0] * y[4] / L
r19 = k19 * y[7]
r20 = k20 * y[0] * y[5] / L
r21 = k21 * y[12]
r22 = k22 * y[0] * y[11] / L

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r23  = k23 * y[14]
r24  = k24 * y[0] * y[12] / L
r25  = k25 * y[16]
r26  = k26 * y[0] * y[14] / L
r27  = k27 * y[18]
r28  = k28 * y[0] * y[16] / L
r29  = k29 * y[28]
r30  = k30 * y[0] * y[26] / L
r31  = k31 * y[30]
r32  = k32 * y[0] * y[28] / L
r33  = k33 * y[4]
r34  = k34 * y[1] * y[2] / L
r35  = k35 * y[5]
r36  = k36 * y[7]
r37  = k37 * y[11]
r38  = k38 * y[14]
r39  = k39 * y[16]
r40  = k40 * y[18]
r41  = k41 * y[30]
r42  = k42 * y[11]
r43  = k43 * y[2] * y[4] / L
r44  = k44 * y[12]
r45  = k45 * y[2] * y[5] / L
r46  = k46 * y[14]
r47  = k47 * y[26]
r48  = k48 * y[28]
r49  = k49 * y[30]
r50  = k50 * y[11]
r51  = k51 * y[12]
r52  = k52 * y[14]
r53  = k53 * y[16]
r54  = k54 * y[26]
r55  = k55 * y[28]
r56  = k56 * y[30]
r57  = k57 * y[14]
r58  = k58 * y[16]
r59  = k59 * y[18]
r60  = k60 * y[28]
r61  = k61 * y[30]
r62  = k62 * y[37]
r63  = k63 * y[18]
r64  = k64 * y[26]
r65  = k65 * y[30]
r66  = k66 * y[37]
r67  = k67 * y[28]
r68  = k68 * y[37]
r69  = k69 * y[0] * y[3] / L
r70  = k70 * y[1] * y[2] / L
r71  = k71 * y[0] * y[4] / L
r72  = k72 * y[0] * y[5] / L
r73  = k73 * y[0] * y[7] / L
r74  = k74 * y[2] * y[3] / L
r75  = k75 * y[2] * y[5] / L
r76  = k76 * y[0] * y[12] / L
r77  = k77 * y[0] * y[12] / L
r78  = k78 * y[0] * y[14] / L
r79  = k79 * y[0] * y[16] / L
r80  = k80 * y[0] * y[16] / L
r81  = k81 * y[0] * y[16] / L

r82  = k82 * y[0] * y[18] / L
r83  = k83 * y[0] * y[18] / L
r84  = k84 * y[0] * y[26] / L
r85  = k85 * y[0] * y[26] / L
r86  = k86 * y[0] * y[28] / L
r87  = k87 * y[0] * y[28] / L
r88  = k88 * y[0] * y[30] / L
r89  = k89 * y[0] * y[30] / L
r90  = k90 * y[0] * y[30] / L
r91  = k91 * y[0] * y[30] / L
r92  = k92 * y[0] * y[37] / L
r93  = k93 * y[0] * y[37] / L
r94  = k94 * y[2] * y[4] / L
r95  = k95 * y[2] * y[11] / L
r96  = k96 * y[2] * y[4] / L
r97  = k97 * y[2] * y[5] / L
r98  = k98 * y[8]
r99  = k99 * y[0] * y[6] / L
r100 = k100 * y[9]
r101 = k101 * y[0] * y[8] / L
r102 = k102 * y[23]
r103 = k103 * y[0] * y[21] / L
r104 = k104 * y[24]
r105 = k105 * y[0] * y[23] / L
r106 = k106 * y[9]
r107 = k107 * y[1] * y[6] / L
r108 = k108 * y[24]
r109 = k109 * y[1] * y[21] / L
r110 = k110 * y[23]
r111 = k111 * y[6] * y[8] / L
r112 = k112 * y[24]
r113 = k113 * y[6] * y[9] / L
r114 = k114 * y[24]
r115 = k115 * y[8] * y[8] / L
r116 = k116 * y[0] * y[8] / L
r117 = k117 * y[1] * y[6] / L
r118 = k118 * y[0] * y[9] / L
r119 = k119 * y[1] * y[8] / L
r120 = k120 * y[0] * y[21] / L
r121 = k121 * y[6] * y[8] / L
r122 = k122 * y[0] * y[23] / L
r123 = k123 * y[0] * y[23] / L
r124 = k124 * y[0] * y[23] / L
r125 = k125 * y[8] * y[8] / L
r126 = k126 * y[0] * y[24] / L
r127 = k127 * y[0] * y[24] / L
r128 = k128 * y[0] * y[45] / L
r129 = k129 * y[6] * y[23] / L
r130 = k130 * y[0] * y[45] / L
r131 = k131 * y[1] * y[21] / L
r132 = k132 * y[6] * y[9] / L
r133 = k133 * y[1] * y[21] / L
r134 = k134 * y[8] * y[8] / L
r135 = k135 * y[6] * y[24] / L
r136 = k136 * y[6] * y[9] / L
r137 = k137 * y[8] * y[8] / L
r138 = k138 * y[6] * y[23] / L
r139 = k139 * y[6] * y[24] / L
r140 = k140 * y[6] * y[24] / L
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r141 = k141 * y[13]
r142 = k142 * y[2] * y[6] / L
r143 = k143 * y[27]
r144 = k144 * y[2] * y[13] / L
r145 = k145 * y[33]
r146 = k146 * y[2] * y[21] / L
r147 = k147 * y[48]
r148 = k148 * y[2] * y[27] / L
r149 = k149 * y[50]
r150 = k150 * y[2] * y[33] / L
r151 = k151 * y[54]
r152 = k152 * y[2] * y[45] / L
r153 = k153 * y[69]
r154 = k154 * y[2] * y[50] / L
r155 = k155 * y[70]
r156 = k156 * y[2] * y[54] / L
r157 = k157 * y[27]
r158 = k158 * y[6] * y[10] / L
r159 = k159 * y[33]
r160 = k160 * y[6] * y[13] / L
r161 = k161 * y[48]
r162 = k162 * y[6] * y[25] / L
r163 = k163 * y[50]
r164 = k164 * y[6] * y[27] / L
r165 = k165 * y[54]
r166 = k166 * y[6] * y[33] / L
r167 = k167 * y[69]
r168 = k168 * y[6] * y[48] / L
r169 = k169 * y[70]
r170 = k170 * y[6] * y[50] / L
r171 = k171 * y[48]
r172 = k172 * y[50]
r173 = k173 * y[69]
r174 = k174 * y[70]
r175 = k175 * y[50]
r176 = k176 * y[54]
r177 = k177 * y[13] * y[21] / L
r178 = k178 * y[69]
r179 = k179 * y[70]
r180 = k180 * y[69]
r181 = k181 * y[70]
r182 = k182 * y[6] * y[10] / L
r183 = k183 * y[2] * y[21] / L
r184 = k184 * y[2] * y[27] / L
r185 = k185 * y[6] * y[25] / L
r186 = k186 * y[2] * y[27] / L
r187 = k187 * y[6] * y[27] / L
r188 = k188 * y[2] * y[33] / L
r189 = k189 * y[2] * y[45] / L
r190 = k190 * y[2] * y[45] / L
r191 = k191 * y[2] * y[48] / L
r192 = k192 * y[2] * y[48] / L
r193 = k193 * y[2] * y[50] / L
r194 = k194 * y[6] * y[48] / L
r195 = k195 * y[2] * y[50] / L
r196 = k196 * y[2] * y[50] / L
r197 = k197 * y[2] * y[50] / L
r198 = k198 * y[2] * y[54] / L
r199 = k199 * y[2] * y[54] / L

r200 = k200 * y[2] * y[54] / L
r201 = k201 * y[6] * y[25] / L
r202 = k202 * y[6] * y[27] / L
r203 = k203 * y[6] * y[27] / L
r204 = k204 * y[6] * y[33] / L
r205 = k205 * y[13] * y[21] / L
r206 = k206 * y[6] * y[48] / L
r207 = k207 * y[6] * y[48] / L
r208 = k208 * y[6] * y[50] / L
r209 = k209 * y[6] * y[50] / L
r210 = k210 * y[6] * y[54] / L
r211 = k211 * y[6] * y[54] / L
r212 = k212 * y[6] * y[69] / L
r213 = k213 * y[6] * y[69] / L
r214 = k214 * y[6] * y[69] / L
r215 = k215 * y[6] * y[70] / L
r216 = k216 * y[6] * y[70] / L
r217 = k217 * y[6] * y[70] / L
r218 = k218 * y[15]
r219 = k219 * y[0] * y[13] / L
r220 = k220 * y[17]
r221 = k221 * y[0] * y[15] / L
r222 = k222 * y[19]
r223 = k223 * y[0] * y[17] / L
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r226 = k226 * y[31]
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r229 = k229 * y[0] * y[29] / L
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r253 = k253 * y[0] * y[58] / L
r254 = k254 * y[64]
r255 = k255 * y[0] * y[62] / L
r256 = k256 * y[65]
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r258 = k258 * y[66]

r259 = k259 * y[0] * y[63] / L
r260 = k260 * y[67]
r261 = k261 * y[0] * y[63] / L
r262 = k262 * y[68]
r263 = k263 * y[0] * y[63] / L
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r307 = k307 * y[67]
r308 = k308 * y[68]
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r311 = k311 * y[2] * y[15] / L
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r313 = k313 * y[2] * y[17] / L
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r315 = k315 * y[2] * y[17] / L
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r320 = k320 * y[2] * y[23] / L
r321 = k321 * y[40]
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r416 = k416 * y[72]
r417 = k417 * y[72]
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r419 = k419 * y[5] * y[6] / L
r420 = k420 * y[20]
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r440 = k440 * y[61]
r441 = k441 * y[63]
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r448 = k448 * y[6] * y[11] / L
r449 = k449 * y[34]
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r459 = k459 * y[40]
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r461 = k461 * y[41]
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r464 = k464 * y[6] * y[17] / L
r465 = k465 * y[43]
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r467 = k467 * y[44]
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r491 = k491 * y[55]
r492 = k492 * y[6] * y[36] / L
r493 = k493 * y[56]
r494 = k494 * y[6] * y[36] / L

r495 = k495 * y[57]
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r497 = k497 * y[58]
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r499 = k499 * y[59]
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r511 = k511 * y[67]
r512 = k512 * y[6] * y[43] / L
r513 = k513 * y[68]
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r515 = k515 * y[65]
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r518 = k518 * y[6] * y[44] / L
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r521 = k521 * y[68]
r522 = k522 * y[6] * y[44] / L
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r525 = k525 * y[72]
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r640 = k640 * y[52]
r641 = k641 * y[53]
r642 = k642 * y[53]
r643 = k643 * y[55]
r644 = k644 * y[56]
r645 = k645 * y[57]
r646 = k646 * y[58]
r647 = k647 * y[62]
r648 = k648 * y[64]
r649 = k649 * y[71]
r650 = k650 * y[71]
r651 = k651 * y[71]
r652 = k652 * y[51]
r653 = k653 * y[52]
r654 = k654 * y[55]
r655 = k655 * y[56]
r656 = k656 * y[57]
r657 = k657 * y[58]
r658 = k658 * y[61]
r659 = k659 * y[63]
r660 = k660 * y[65]
r661 = k661 * y[66]
r662 = k662 * y[67]
r663 = k663 * y[68]
r664 = k664 * y[72]
r665 = k665 * y[72]
r666 = k666 * y[52]
r667 = k667 * y[62]
r668 = k668 * y[63]
r669 = k669 * y[64]
r670 = k670 * y[71]
r671 = k671 * y[61]

r672 = k672 * y[61]
r673 = k673 * y[63]
r674 = k674 * y[65]
r675 = k675 * y[66]
r676 = k676 * y[67]
r677 = k677 * y[68]
r678 = k678 * y[61]
r679 = k679 * y[63]
r680 = k680 * y[63]
r681 = k681 * y[64]
r682 = k682 * y[65]
r683 = k683 * y[66]
r684 = k684 * y[67]
r685 = k685 * y[68]
r686 = k686 * y[71]
r687 = k687 * y[72]
r688 = k688 * y[72]
r689 = k689 * y[65]
r690 = k690 * y[66]
r691 = k691 * y[67]
r692 = k692 * y[68]
r693 = k693 * y[72]
r694 = k694 * y[72]
r695 = k695 * y[72]
r696 = k696 * y[65]
r697 = k697 * y[66]
r698 = k698 * y[67]
r699 = k699 * y[68]
r700 = k700 * y[65]
r701 = k701 * y[66]
r702 = k702 * y[67]
r703 = k703 * y[68]
r704 = k704 * y[72]
r705 = k705 * y[65]
r706 = k706 * y[66]
r707 = k707 * y[67]
r708 = k708 * y[68]
r709 = k709 * y[72]
r710 = k710 * y[71]
r711 = k711 * y[71]
r712 = k712 * y[72]
r713 = k713 * y[72]
r714 = k714 * y[72]
r715 = k715 * y[72]
r716 = k716 * y[71]
r717 = k717 * y[71]
r718 = k718 * y[0] * y[15] / L
r719 = k719 * y[0] * y[17] / L
r720 = k720 * y[5] * y[6] / L
r721 = k721 * y[0] * y[19] / L
r722 = k722 * y[0] * y[20] / L
r723 = k723 * y[0] * y[19] / L
r724 = k724 * y[0] * y[19] / L
r725 = k725 * y[6] * y[7] / L
r726 = k726 * y[0] * y[20] / L
r727 = k727 * y[0] * y[20] / L
r728 = k728 * y[6] * y[7] / L
r729 = k729 * y[0] * y[22] / L
r730 = k730 * y[0] * y[22] / L

r731 = k731 * y[0] * y[22] / L
r732 = k732 * y[0] * y[22] / L
r733 = k733 * y[0] * y[29] / L
r734 = k734 * y[2] * y[17] / L
r735 = k735 * y[0] * y[29] / L
r736 = k736 * y[0] * y[29] / L
r737 = k737 * y[6] * y[11] / L
r738 = k738 * y[0] * y[29] / L
r739 = k739 * y[0] * y[31] / L
r740 = k740 * y[0] * y[32] / L
r741 = k741 * y[0] * y[31] / L
r742 = k742 * y[0] * y[31] / L
r743 = k743 * y[6] * y[12] / L
r744 = k744 * y[0] * y[31] / L
r745 = k745 * y[0] * y[32] / L
r746 = k746 * y[0] * y[32] / L
r747 = k747 * y[0] * y[32] / L
r748 = k748 * y[0] * y[32] / L
r749 = k749 * y[6] * y[12] / L
r750 = k750 * y[0] * y[32] / L
r751 = k751 * y[2] * y[23] / L
r752 = k752 * y[6] * y[15] / L
r753 = k753 * y[0] * y[33] / L
r754 = k754 * y[0] * y[34] / L
r755 = k755 * y[0] * y[35] / L
r756 = k756 * y[0] * y[34] / L
r757 = k757 * y[0] * y[36] / L
r758 = k758 * y[0] * y[34] / L
r759 = k759 * y[0] * y[35] / L
r760 = k760 * y[0] * y[36] / L
r761 = k761 * y[0] * y[35] / L
r762 = k762 * y[0] * y[36] / L
r763 = k763 * y[0] * y[38] / L
r764 = k764 * y[2] * y[24] / L
r765 = k765 * y[0] * y[38] / L
r766 = k766 * y[6] * y[17] / L
r767 = k767 * y[0] * y[38] / L
r768 = k768 * y[0] * y[38] / L
r769 = k769 * y[0] * y[39] / L
r770 = k770 * y[0] * y[39] / L
r771 = k771 * y[0] * y[39] / L
r772 = k772 * y[0] * y[39] / L
r773 = k773 * y[0] * y[39] / L
r774 = k774 * y[0] * y[39] / L
r775 = k775 * y[0] * y[39] / L
r776 = k776 * y[6] * y[18] / L
r777 = k777 * y[0] * y[39] / L
r778 = k778 * y[0] * y[39] / L
r779 = k779 * y[0] * y[39] / L
r780 = k780 * y[0] * y[40] / L
r781 = k781 * y[0] * y[40] / L
r782 = k782 * y[0] * y[42] / L
r783 = k783 * y[0] * y[40] / L
r784 = k784 * y[0] * y[40] / L
r785 = k785 * y[0] * y[40] / L
r786 = k786 * y[0] * y[40] / L
r787 = k787 * y[6] * y[19] / L
r788 = k788 * y[0] * y[40] / L
r789 = k789 * y[6] * y[20] / L

r790 = k790 * y[0] * y[40] / L
r791 = k791 * y[0] * y[40] / L
r792 = k792 * y[0] * y[42] / L
r793 = k793 * y[0] * y[41] / L
r794 = k794 * y[6] * y[19] / L
r795 = k795 * y[6] * y[20] / L
r796 = k796 * y[0] * y[41] / L
r797 = k797 * y[0] * y[41] / L
r798 = k798 * y[0] * y[42] / L
r799 = k799 * y[0] * y[42] / L
r800 = k800 * y[0] * y[42] / L
r801 = k801 * y[0] * y[42] / L
r802 = k802 * y[0] * y[42] / L
r803 = k803 * y[6] * y[19] / L
r804 = k804 * y[0] * y[42] / L
r805 = k805 * y[6] * y[20] / L
r806 = k806 * y[0] * y[42] / L
r807 = k807 * y[0] * y[42] / L
r808 = k808 * y[0] * y[43] / L
r809 = k809 * y[0] * y[44] / L
r810 = k810 * y[0] * y[43] / L
r811 = k811 * y[0] * y[43] / L
r812 = k812 * y[0] * y[44] / L
r813 = k813 * y[0] * y[44] / L
r814 = k814 * y[0] * y[47] / L
r815 = k815 * y[0] * y[46] / L
r816 = k816 * y[0] * y[46] / L
r817 = k817 * y[0] * y[46] / L
r818 = k818 * y[0] * y[46] / L
r819 = k819 * y[0] * y[47] / L
r820 = k820 * y[0] * y[47] / L
r821 = k821 * y[0] * y[47] / L
r822 = k822 * y[0] * y[47] / L
r823 = k823 * y[0] * y[49] / L
r824 = k824 * y[0] * y[49] / L
r825 = k825 * y[0] * y[49] / L
r826 = k826 * y[0] * y[49] / L
r827 = k827 * y[2] * y[38] / L
r828 = k828 * y[0] * y[50] / L
r829 = k829 * y[0] * y[50] / L
r830 = k830 * y[0] * y[51] / L
r831 = k831 * y[0] * y[51] / L
r832 = k832 * y[0] * y[51] / L
r833 = k833 * y[0] * y[51] / L
r834 = k834 * y[0] * y[51] / L
r835 = k835 * y[0] * y[51] / L
r836 = k836 * y[0] * y[51] / L
r837 = k837 * y[0] * y[51] / L
r838 = k838 * y[0] * y[51] / L
r839 = k839 * y[0] * y[51] / L
r840 = k840 * y[0] * y[51] / L
r841 = k841 * y[0] * y[51] / L
r842 = k842 * y[0] * y[51] / L
r843 = k843 * y[0] * y[52] / L
r844 = k844 * y[0] * y[52] / L
r845 = k845 * y[0] * y[52] / L
r846 = k846 * y[0] * y[53] / L
r847 = k847 * y[0] * y[53] / L
r848 = k848 * y[0] * y[53] / L

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r849 = k849 * y[0] * y[53] / L          r908 = k908 * y[0] * y[58] / L
r850 = k850 * y[0] * y[53] / L          r909 = k909 * y[0] * y[58] / L
r851 = k851 * y[0] * y[54] / L          r910 = k910 * y[0] * y[58] / L
r852 = k852 * y[6] * y[38] / L          r911 = k911 * y[0] * y[59] / L
r853 = k853 * y[0] * y[54] / L          r912 = k912 * y[0] * y[60] / L
r854 = k854 * y[0] * y[54] / L          r913 = k913 * y[0] * y[59] / L
r855 = k855 * y[0] * y[54] / L          r914 = k914 * y[0] * y[61] / L
r856 = k856 * y[0] * y[55] / L          r915 = k915 * y[0] * y[60] / L
r857 = k857 * y[0] * y[56] / L          r916 = k916 * y[0] * y[61] / L
r858 = k858 * y[0] * y[55] / L          r917 = k917 * y[0] * y[62] / L
r859 = k859 * y[0] * y[57] / L          r918 = k918 * y[0] * y[63] / L
r860 = k860 * y[0] * y[55] / L          r919 = k919 * y[0] * y[63] / L
r861 = k861 * y[0] * y[58] / L          r920 = k920 * y[0] * y[63] / L
r862 = k862 * y[0] * y[55] / L          r921 = k921 * y[0] * y[63] / L
r863 = k863 * y[0] * y[55] / L          r922 = k922 * y[0] * y[63] / L
r864 = k864 * y[6] * y[39] / L          r923 = k923 * y[0] * y[63] / L
r865 = k865 * y[0] * y[55] / L          r924 = k924 * y[6] * y[43] / L
r866 = k866 * y[0] * y[55] / L          r925 = k925 * y[0] * y[63] / L
r867 = k867 * y[0] * y[55] / L          r926 = k926 * y[6] * y[44] / L
r868 = k868 * y[0] * y[55] / L          r927 = k927 * y[0] * y[63] / L
r869 = k869 * y[0] * y[55] / L          r928 = k928 * y[0] * y[63] / L
r870 = k870 * y[0] * y[55] / L          r929 = k929 * y[0] * y[63] / L
r871 = k871 * y[0] * y[55] / L          r930 = k930 * y[0] * y[63] / L
r872 = k872 * y[0] * y[56] / L          r931 = k931 * y[0] * y[63] / L
r873 = k873 * y[0] * y[57] / L          r932 = k932 * y[0] * y[63] / L
r874 = k874 * y[0] * y[56] / L          r933 = k933 * y[0] * y[63] / L
r875 = k875 * y[0] * y[58] / L          r934 = k934 * y[0] * y[63] / L
r876 = k876 * y[0] * y[56] / L          r935 = k935 * y[0] * y[63] / L
r877 = k877 * y[0] * y[56] / L          r936 = k936 * y[0] * y[63] / L
r878 = k878 * y[6] * y[39] / L          r937 = k937 * y[0] * y[63] / L
r879 = k879 * y[0] * y[56] / L          r938 = k938 * y[0] * y[63] / L
r880 = k880 * y[0] * y[56] / L          r939 = k939 * y[0] * y[63] / L
r881 = k881 * y[0] * y[56] / L          r940 = k940 * y[0] * y[63] / L
r882 = k882 * y[0] * y[56] / L          r941 = k941 * y[0] * y[64] / L
r883 = k883 * y[0] * y[56] / L          r942 = k942 * y[0] * y[64] / L
r884 = k884 * y[0] * y[56] / L          r943 = k943 * y[0] * y[64] / L
r885 = k885 * y[0] * y[56] / L          r944 = k944 * y[0] * y[65] / L
r886 = k886 * y[0] * y[57] / L          r945 = k945 * y[0] * y[66] / L
r887 = k887 * y[0] * y[58] / L          r946 = k946 * y[0] * y[67] / L
r888 = k888 * y[0] * y[57] / L          r947 = k947 * y[0] * y[65] / L
r889 = k889 * y[0] * y[57] / L          r948 = k948 * y[0] * y[68] / L
r890 = k890 * y[6] * y[39] / L          r949 = k949 * y[0] * y[65] / L
r891 = k891 * y[0] * y[57] / L          r950 = k950 * y[0] * y[65] / L
r892 = k892 * y[0] * y[57] / L          r951 = k951 * y[0] * y[65] / L
r893 = k893 * y[0] * y[57] / L          r952 = k952 * y[0] * y[65] / L
r894 = k894 * y[0] * y[57] / L          r953 = k953 * y[0] * y[65] / L
r895 = k895 * y[0] * y[57] / L          r954 = k954 * y[0] * y[65] / L
r896 = k896 * y[0] * y[57] / L          r955 = k955 * y[0] * y[65] / L
r897 = k897 * y[0] * y[57] / L          r956 = k956 * y[0] * y[65] / L
r898 = k898 * y[0] * y[57] / L          r957 = k957 * y[0] * y[67] / L
r899 = k899 * y[0] * y[58] / L          r958 = k958 * y[0] * y[66] / L
r900 = k900 * y[0] * y[58] / L          r959 = k959 * y[0] * y[68] / L
r901 = k901 * y[6] * y[39] / L          r960 = k960 * y[0] * y[66] / L
r902 = k902 * y[0] * y[58] / L          r961 = k961 * y[0] * y[66] / L
r903 = k903 * y[0] * y[58] / L          r962 = k962 * y[0] * y[66] / L
r904 = k904 * y[0] * y[58] / L          r963 = k963 * y[0] * y[66] / L
r905 = k905 * y[0] * y[58] / L          r964 = k964 * y[0] * y[66] / L
r906 = k906 * y[0] * y[58] / L          r965 = k965 * y[0] * y[66] / L
r907 = k907 * y[0] * y[58] / L          r966 = k966 * y[0] * y[66] / L
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r967  = k967 * y[0] * y[66] / L
r968  = k968 * y[0] * y[67] / L
r969  = k969 * y[0] * y[67] / L
r970  = k970 * y[0] * y[67] / L
r971  = k971 * y[0] * y[67] / L
r972  = k972 * y[0] * y[67] / L
r973  = k973 * y[0] * y[67] / L
r974  = k974 * y[0] * y[67] / L
r975  = k975 * y[0] * y[67] / L
r976  = k976 * y[0] * y[67] / L
r977  = k977 * y[0] * y[68] / L
r978  = k978 * y[0] * y[68] / L
r979  = k979 * y[0] * y[68] / L
r980  = k980 * y[0] * y[68] / L
r981  = k981 * y[0] * y[68] / L
r982  = k982 * y[0] * y[68] / L
r983  = k983 * y[0] * y[68] / L
r984  = k984 * y[0] * y[68] / L
r985  = k985 * y[6] * y[49] / L
r986  = k986 * y[0] * y[69] / L
r987  = k987 * y[0] * y[70] / L
r988  = k988 * y[0] * y[70] / L
r989  = k989 * y[0] * y[70] / L
r990  = k990 * y[0] * y[70] / L
r991  = k991 * y[0] * y[71] / L
r992  = k992 * y[0] * y[71] / L
r993  = k993 * y[0] * y[71] / L
r994  = k994 * y[6] * y[53] / L
r995  = k995 * y[0] * y[71] / L
r996  = k996 * y[0] * y[71] / L
r997  = k997 * y[0] * y[71] / L
r998  = k998 * y[0] * y[71] / L
r999  = k999 * y[0] * y[71] / L
r1000 = k1000 * y[0] * y[72] / L
r1001 = k1001 * y[0] * y[72] / L
r1002 = k1002 * y[0] * y[72] / L
r1003 = k1003 * y[0] * y[72] / L
r1004 = k1004 * y[0] * y[72] / L
r1005 = k1005 * y[0] * y[72] / L
r1006 = k1006 * y[0] * y[72] / L
r1007 = k1007 * y[0] * y[72] / L
r1008 = k1008 * y[0] * y[72] / L
r1009 = k1009 * y[0] * y[72] / L
r1010 = k1010 * y[0] * y[72] / L
r1011 = k1011 * y[0] * y[72] / L
r1012 = k1012 * y[0] * y[72] / L
r1013 = k1013 * y[0] * y[72] / L
r1014 = k1014 * y[0] * y[72] / L
r1015 = k1015 * y[5] * y[6] / L
r1016 = k1016 * y[6] * y[7] / L
r1017 = k1017 * y[2] * y[17] / L
r1018 = k1018 * y[6] * y[11] / L
r1019 = k1019 * y[6] * y[12] / L
r1020 = k1020 * y[6] * y[14] / L
r1021 = k1021 * y[6] * y[14] / L
r1022 = k1022 * y[2] * y[24] / L
r1023 = k1023 * y[6] * y[17] / L
r1024 = k1024 * y[6] * y[18] / L
r1025 = k1025 * y[6] * y[18] / L
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r1026 = k1026 * y[6] * y[18] / L
r1027 = k1027 * y[6] * y[19] / L
r1028 = k1028 * y[6] * y[20] / L
r1029 = k1029 * y[6] * y[22] / L
r1030 = k1030 * y[6] * y[22] / L
r1031 = k1031 * y[6] * y[22] / L
r1032 = k1032 * y[6] * y[31] / L
r1033 = k1033 * y[6] * y[32] / L
r1034 = k1034 * y[6] * y[39] / L
r1035 = k1035 * y[6] * y[43] / L
r1036 = k1036 * y[6] * y[44] / L
r1037 = k1037 * y[6] * y[43] / L
r1038 = k1038 * y[6] * y[44] / L
r1039 = k1039 * y[6] * y[43] / L
r1040 = k1040 * y[6] * y[44] / L
r1041 = k1041 * y[6] * y[43] / L
r1042 = k1042 * y[6] * y[44] / L
r1043 = k1043 * y[6] * y[46] / L
r1044 = k1044 * y[6] * y[47] / L
r1045 = k1045 * y[6] * y[55] / L
r1046 = k1046 * y[6] * y[56] / L
r1047 = k1047 * y[6] * y[57] / L
r1048 = k1048 * y[6] * y[58] / L
r1049 = k1049 * y[2] * y[8] / L
r1050 = k1050 * y[3] * y[6] / L
r1051 = k1051 * y[2] * y[9] / L
r1052 = k1052 * y[2] * y[9] / L
r1053 = k1053 * y[4] * y[6] / L
r1054 = k1054 * y[2] * y[15] / L
r1055 = k1055 * y[2] * y[15] / L
r1056 = k1056 * y[2] * y[17] / L
r1057 = k1057 * y[2] * y[17] / L
r1058 = k1058 * y[2] * y[17] / L
r1059 = k1059 * y[6] * y[11] / L
r1060 = k1060 * y[2] * y[17] / L
r1061 = k1061 * y[6] * y[12] / L
r1062 = k1062 * y[6] * y[12] / L
r1063 = k1063 * y[2] * y[23] / L
r1064 = k1064 * y[2] * y[23] / L
r1065 = k1065 * y[2] * y[23] / L
r1066 = k1066 * y[2] * y[24] / L
r1067 = k1067 * y[2] * y[24] / L
r1068 = k1068 * y[2] * y[24] / L
r1069 = k1069 * y[2] * y[24] / L
r1070 = k1070 * y[2] * y[24] / L
r1071 = k1071 * y[2] * y[29] / L
r1072 = k1072 * y[2] * y[29] / L
r1073 = k1073 * y[6] * y[28] / L
r1074 = k1074 * y[6] * y[28] / L
r1075 = k1075 * y[2] * y[38] / L
r1076 = k1076 * y[2] * y[38] / L
r1077 = k1077 * y[6] * y[34] / L
r1078 = k1078 * y[6] * y[35] / L
r1079 = k1079 * y[4] * y[6] / L
r1080 = k1080 * y[5] * y[6] / L
r1081 = k1081 * y[6] * y[11] / L
r1082 = k1082 * y[6] * y[12] / L
r1083 = k1083 * y[6] * y[16] / L
r1084 = k1084 * y[6] * y[20] / L
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r1085 = k1085 * y[6] * y[26] / L
r1086 = k1086 * y[6] * y[26] / L
r1087 = k1087 * y[6] * y[30] / L
r1088 = k1088 * y[6] * y[30] / L
r1089 = k1089 * y[6] * y[30] / L
r1090 = k1090 * y[6] * y[39] / L
r1091 = k1091 * y[6] * y[49] / L
r1092 = k1092 * y[6] * y[51] / L
r1093 = k1093 * y[6] * y[51] / L
r1094 = k1094 * y[6] * y[51] / L
r1095 = k1095 * y[6] * y[51] / L
r1096 = k1096 * y[6] * y[53] / L
r1097 = k1097 * y[5] * y[6] / L
r1098 = k1098 * y[6] * y[11] / L
r1099 = k1099 * y[6] * y[12] / L
r1100 = k1100 * y[6] * y[14] / L
r1101 = k1101 * y[6] * y[16] / L
r1102 = k1102 * y[6] * y[16] / L
r1103 = k1103 * y[6] * y[18] / L
r1104 = k1104 * y[6] * y[19] / L
r1105 = k1105 * y[6] * y[20] / L
r1106 = k1106 * y[6] * y[26] / L
r1107 = k1107 * y[6] * y[28] / L
r1108 = k1108 * y[6] * y[28] / L
r1109 = k1109 * y[6] * y[35] / L
r1110 = k1110 * y[6] * y[34] / L
r1111 = k1111 * y[6] * y[35] / L
r1112 = k1112 * y[6] * y[36] / L
r1113 = k1113 * y[6] * y[43] / L
r1114 = k1114 * y[6] * y[44] / L
r1115 = k1115 * y[6] * y[44] / L
r1116 = k1116 * y[6] * y[51] / L
r1117 = k1117 * y[6] * y[52] / L
r1118 = k1118 * y[6] * y[52] / L
r1119 = k1119 * y[6] * y[52] / L
r1120 = k1120 * y[6] * y[52] / L
r1121 = k1121 * y[6] * y[53] / L
r1122 = k1122 * y[6] * y[59] / L
r1123 = k1123 * y[6] * y[60] / L
r1124 = k1124 * y[6] * y[61] / L
r1125 = k1125 * y[6] * y[59] / L
r1126 = k1126 * y[6] * y[60] / L
r1127 = k1127 * y[6] * y[61] / L
r1128 = k1128 * y[6] * y[59] / L
r1129 = k1129 * y[6] * y[60] / L
r1130 = k1130 * y[6] * y[61] / L
r1131 = k1131 * y[6] * y[12] / L
r1132 = k1132 * y[6] * y[14] / L
r1133 = k1133 * y[6] * y[16] / L
r1134 = k1134 * y[6] * y[18] / L
r1135 = k1135 * y[6] * y[18] / L
r1136 = k1136 * y[6] * y[19] / L
r1137 = k1137 * y[6] * y[20] / L
r1138 = k1138 * y[6] * y[22] / L
r1139 = k1139 * y[6] * y[26] / L
r1140 = k1140 * y[6] * y[28] / L
r1141 = k1141 * y[6] * y[30] / L
r1142 = k1142 * y[6] * y[30] / L
r1143 = k1143 * y[6] * y[34] / L

r1144 = k1144 * y[6] * y[35] / L
r1145 = k1145 * y[6] * y[36] / L
r1146 = k1146 * y[6] * y[39] / L
r1147 = k1147 * y[6] * y[39] / L
r1148 = k1148 * y[6] * y[39] / L
r1149 = k1149 * y[6] * y[52] / L
r1150 = k1150 * y[6] * y[53] / L
r1151 = k1151 * y[6] * y[59] / L
r1152 = k1152 * y[6] * y[60] / L
r1153 = k1153 * y[6] * y[61] / L
r1154 = k1154 * y[6] * y[11] / L
r1155 = k1155 * y[6] * y[12] / L
r1156 = k1156 * y[6] * y[14] / L
r1157 = k1157 * y[6] * y[14] / L
r1158 = k1158 * y[6] * y[14] / L
r1159 = k1159 * y[6] * y[15] / L
r1160 = k1160 * y[6] * y[16] / L
r1161 = k1161 * y[6] * y[16] / L
r1162 = k1162 * y[6] * y[17] / L
r1163 = k1163 * y[6] * y[17] / L
r1164 = k1164 * y[6] * y[18] / L
r1165 = k1165 * y[6] * y[18] / L
r1166 = k1166 * y[6] * y[18] / L
r1167 = k1167 * y[6] * y[19] / L
r1168 = k1168 * y[6] * y[20] / L
r1169 = k1169 * y[6] * y[19] / L
r1170 = k1170 * y[6] * y[19] / L
r1171 = k1171 * y[6] * y[20] / L
r1172 = k1172 * y[6] * y[20] / L
r1173 = k1173 * y[6] * y[22] / L
r1174 = k1174 * y[6] * y[22] / L
r1175 = k1175 * y[6] * y[22] / L
r1176 = k1176 * y[6] * y[22] / L
r1177 = k1177 * y[6] * y[26] / L
r1178 = k1178 * y[6] * y[26] / L
r1179 = k1179 * y[6] * y[28] / L
r1180 = k1180 * y[6] * y[28] / L
r1181 = k1181 * y[6] * y[28] / L
r1182 = k1182 * y[6] * y[28] / L
r1183 = k1183 * y[6] * y[28] / L
r1184 = k1184 * y[6] * y[28] / L
r1185 = k1185 * y[6] * y[29] / L
r1186 = k1186 * y[6] * y[30] / L
r1187 = k1187 * y[6] * y[30] / L
r1188 = k1188 * y[6] * y[30] / L
r1189 = k1189 * y[6] * y[30] / L
r1190 = k1190 * y[6] * y[30] / L
r1191 = k1191 * y[6] * y[30] / L
r1192 = k1192 * y[6] * y[30] / L
r1193 = k1193 * y[6] * y[30] / L
r1194 = k1194 * y[6] * y[31] / L
r1195 = k1195 * y[6] * y[32] / L
r1196 = k1196 * y[6] * y[31] / L
r1197 = k1197 * y[6] * y[31] / L
r1198 = k1198 * y[6] * y[31] / L
r1199 = k1199 * y[6] * y[32] / L
r1200 = k1200 * y[6] * y[32] / L
r1201 = k1201 * y[6] * y[32] / L
r1202 = k1202 * y[6] * y[34] / L

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r1203 = k1203 * y[6] * y[35] / L          r1262 = k1262 * y[6] * y[44] / L
r1204 = k1204 * y[6] * y[34] / L          r1263 = k1263 * y[6] * y[44] / L
r1205 = k1205 * y[6] * y[36] / L          r1264 = k1264 * y[6] * y[44] / L
r1206 = k1206 * y[6] * y[34] / L          r1265 = k1265 * y[6] * y[44] / L
r1207 = k1207 * y[6] * y[34] / L          r1266 = k1266 * y[6] * y[44] / L
r1208 = k1208 * y[6] * y[34] / L          r1267 = k1267 * y[6] * y[44] / L
r1209 = k1209 * y[6] * y[34] / L          r1268 = k1268 * y[6] * y[44] / L
r1210 = k1210 * y[6] * y[34] / L          r1269 = k1269 * y[6] * y[44] / L
r1211 = k1211 * y[6] * y[35] / L          r1270 = k1270 * y[6] * y[44] / L
r1212 = k1212 * y[6] * y[36] / L          r1271 = k1271 * y[6] * y[44] / L
r1213 = k1213 * y[6] * y[35] / L          r1272 = k1272 * y[6] * y[47] / L
r1214 = k1214 * y[6] * y[35] / L          r1273 = k1273 * y[6] * y[46] / L
r1215 = k1215 * y[6] * y[35] / L          r1274 = k1274 * y[6] * y[46] / L
r1216 = k1216 * y[6] * y[35] / L          r1275 = k1275 * y[6] * y[46] / L
r1217 = k1217 * y[6] * y[35] / L          r1276 = k1276 * y[6] * y[46] / L
r1218 = k1218 * y[6] * y[36] / L          r1277 = k1277 * y[6] * y[46] / L
r1219 = k1219 * y[6] * y[36] / L          r1278 = k1278 * y[6] * y[47] / L
r1220 = k1220 * y[6] * y[36] / L          r1279 = k1279 * y[6] * y[47] / L
r1221 = k1221 * y[6] * y[36] / L          r1280 = k1280 * y[6] * y[47] / L
r1222 = k1222 * y[6] * y[38] / L          r1281 = k1281 * y[6] * y[47] / L
r1223 = k1223 * y[6] * y[38] / L          r1282 = k1282 * y[6] * y[47] / L
r1224 = k1224 * y[6] * y[38] / L          r1283 = k1283 * y[6] * y[49] / L
r1225 = k1225 * y[6] * y[39] / L          r1284 = k1284 * y[6] * y[49] / L
r1226 = k1226 * y[6] * y[39] / L          r1285 = k1285 * y[6] * y[49] / L
r1227 = k1227 * y[6] * y[39] / L          r1286 = k1286 * y[6] * y[49] / L
r1228 = k1228 * y[6] * y[39] / L          r1287 = k1287 * y[6] * y[51] / L
r1229 = k1229 * y[6] * y[39] / L          r1288 = k1288 * y[6] * y[51] / L
r1230 = k1230 * y[6] * y[39] / L          r1289 = k1289 * y[6] * y[51] / L
r1231 = k1231 * y[6] * y[39] / L          r1290 = k1290 * y[6] * y[51] / L
r1232 = k1232 * y[6] * y[39] / L          r1291 = k1291 * y[6] * y[51] / L
r1233 = k1233 * y[6] * y[39] / L          r1292 = k1292 * y[6] * y[51] / L
r1234 = k1234 * y[6] * y[39] / L          r1293 = k1293 * y[6] * y[51] / L
r1235 = k1235 * y[6] * y[40] / L          r1294 = k1294 * y[6] * y[51] / L
r1236 = k1236 * y[6] * y[40] / L          r1295 = k1295 * y[6] * y[51] / L
r1237 = k1237 * y[6] * y[42] / L          r1296 = k1296 * y[6] * y[51] / L
r1238 = k1238 * y[6] * y[40] / L          r1297 = k1297 * y[6] * y[51] / L
r1239 = k1239 * y[6] * y[42] / L          r1298 = k1298 * y[6] * y[51] / L
r1240 = k1240 * y[6] * y[41] / L          r1299 = k1299 * y[6] * y[51] / L
r1241 = k1241 * y[6] * y[42] / L          r1300 = k1300 * y[6] * y[51] / L
r1242 = k1242 * y[6] * y[43] / L          r1301 = k1301 * y[6] * y[51] / L
r1243 = k1243 * y[6] * y[44] / L          r1302 = k1302 * y[6] * y[51] / L
r1244 = k1244 * y[6] * y[43] / L          r1303 = k1303 * y[6] * y[51] / L
r1245 = k1245 * y[6] * y[43] / L          r1304 = k1304 * y[6] * y[52] / L
r1246 = k1246 * y[6] * y[43] / L          r1305 = k1305 * y[6] * y[52] / L
r1247 = k1247 * y[6] * y[43] / L          r1306 = k1306 * y[6] * y[52] / L
r1248 = k1248 * y[6] * y[43] / L          r1307 = k1307 * y[6] * y[52] / L
r1249 = k1249 * y[6] * y[43] / L          r1308 = k1308 * y[6] * y[52] / L
r1250 = k1250 * y[6] * y[43] / L          r1309 = k1309 * y[6] * y[52] / L
r1251 = k1251 * y[6] * y[43] / L          r1310 = k1310 * y[6] * y[52] / L
r1252 = k1252 * y[6] * y[43] / L          r1311 = k1311 * y[6] * y[52] / L
r1253 = k1253 * y[6] * y[43] / L          r1312 = k1312 * y[6] * y[52] / L
r1254 = k1254 * y[6] * y[43] / L          r1313 = k1313 * y[6] * y[52] / L
r1255 = k1255 * y[6] * y[43] / L          r1314 = k1314 * y[6] * y[52] / L
r1256 = k1256 * y[6] * y[43] / L          r1315 = k1315 * y[6] * y[52] / L
r1257 = k1257 * y[6] * y[43] / L          r1316 = k1316 * y[6] * y[52] / L
r1258 = k1258 * y[6] * y[44] / L          r1317 = k1317 * y[6] * y[52] / L
r1259 = k1259 * y[6] * y[44] / L          r1318 = k1318 * y[6] * y[52] / L
r1260 = k1260 * y[6] * y[44] / L          r1319 = k1319 * y[6] * y[52] / L
r1261 = k1261 * y[6] * y[44] / L          r1320 = k1320 * y[6] * y[52] / L
```

r1321 = k1321 * y[6] * y[52] / L
r1322 = k1322 * y[6] * y[53] / L
r1323 = k1323 * y[6] * y[53] / L
r1324 = k1324 * y[6] * y[53] / L
r1325 = k1325 * y[6] * y[53] / L
r1326 = k1326 * y[6] * y[53] / L
r1327 = k1327 * y[6] * y[53] / L
r1328 = k1328 * y[6] * y[53] / L
r1329 = k1329 * y[6] * y[53] / L
r1330 = k1330 * y[6] * y[53] / L
r1331 = k1331 * y[6] * y[55] / L
r1332 = k1332 * y[6] * y[56] / L
r1333 = k1333 * y[6] * y[55] / L
r1334 = k1334 * y[6] * y[57] / L
r1335 = k1335 * y[6] * y[55] / L
r1336 = k1336 * y[6] * y[58] / L
r1337 = k1337 * y[6] * y[55] / L
r1338 = k1338 * y[6] * y[55] / L
r1339 = k1339 * y[6] * y[55] / L
r1340 = k1340 * y[6] * y[55] / L
r1341 = k1341 * y[6] * y[55] / L
r1342 = k1342 * y[6] * y[55] / L
r1343 = k1343 * y[6] * y[55] / L
r1344 = k1344 * y[6] * y[55] / L
r1345 = k1345 * y[6] * y[55] / L
r1346 = k1346 * y[6] * y[56] / L
r1347 = k1347 * y[6] * y[57] / L
r1348 = k1348 * y[6] * y[56] / L
r1349 = k1349 * y[6] * y[58] / L
r1350 = k1350 * y[6] * y[56] / L
r1351 = k1351 * y[6] * y[56] / L
r1352 = k1352 * y[6] * y[56] / L
r1353 = k1353 * y[6] * y[56] / L
r1354 = k1354 * y[6] * y[56] / L
r1355 = k1355 * y[6] * y[56] / L
r1356 = k1356 * y[6] * y[56] / L
r1357 = k1357 * y[6] * y[56] / L
r1358 = k1358 * y[6] * y[56] / L
r1359 = k1359 * y[6] * y[57] / L
r1360 = k1360 * y[6] * y[58] / L
r1361 = k1361 * y[6] * y[57] / L
r1362 = k1362 * y[6] * y[57] / L
r1363 = k1363 * y[6] * y[57] / L
r1364 = k1364 * y[6] * y[57] / L
r1365 = k1365 * y[6] * y[57] / L
r1366 = k1366 * y[6] * y[57] / L
r1367 = k1367 * y[6] * y[57] / L
r1368 = k1368 * y[6] * y[57] / L
r1369 = k1369 * y[6] * y[57] / L
r1370 = k1370 * y[6] * y[58] / L
r1371 = k1371 * y[6] * y[58] / L
r1372 = k1372 * y[6] * y[58] / L
r1373 = k1373 * y[6] * y[58] / L
r1374 = k1374 * y[6] * y[58] / L
r1375 = k1375 * y[6] * y[58] / L
r1376 = k1376 * y[6] * y[58] / L
r1377 = k1377 * y[6] * y[58] / L
r1378 = k1378 * y[6] * y[58] / L
r1379 = k1379 * y[6] * y[59] / L

r1380 = k1380 * y[6] * y[60] / L
r1381 = k1381 * y[6] * y[59] / L
r1382 = k1382 * y[6] * y[61] / L
r1383 = k1383 * y[6] * y[59] / L
r1384 = k1384 * y[6] * y[59] / L
r1385 = k1385 * y[6] * y[59] / L
r1386 = k1386 * y[6] * y[59] / L
r1387 = k1387 * y[6] * y[59] / L
r1388 = k1388 * y[6] * y[59] / L
r1389 = k1389 * y[6] * y[59] / L
r1390 = k1390 * y[6] * y[59] / L
r1391 = k1391 * y[6] * y[59] / L
r1392 = k1392 * y[6] * y[59] / L
r1393 = k1393 * y[6] * y[59] / L
r1394 = k1394 * y[6] * y[59] / L
r1395 = k1395 * y[6] * y[59] / L
r1396 = k1396 * y[6] * y[59] / L
r1397 = k1397 * y[6] * y[59] / L
r1398 = k1398 * y[6] * y[59] / L
r1399 = k1399 * y[6] * y[59] / L
r1400 = k1400 * y[6] * y[59] / L
r1401 = k1401 * y[6] * y[60] / L
r1402 = k1402 * y[6] * y[61] / L
r1403 = k1403 * y[6] * y[60] / L
r1404 = k1404 * y[6] * y[60] / L
r1405 = k1405 * y[6] * y[60] / L
r1406 = k1406 * y[6] * y[60] / L
r1407 = k1407 * y[6] * y[60] / L
r1408 = k1408 * y[6] * y[60] / L
r1409 = k1409 * y[6] * y[60] / L
r1410 = k1410 * y[6] * y[60] / L
r1411 = k1411 * y[6] * y[60] / L
r1412 = k1412 * y[6] * y[60] / L
r1413 = k1413 * y[6] * y[60] / L
r1414 = k1414 * y[6] * y[60] / L
r1415 = k1415 * y[6] * y[60] / L
r1416 = k1416 * y[6] * y[60] / L
r1417 = k1417 * y[6] * y[60] / L
r1418 = k1418 * y[6] * y[60] / L
r1419 = k1419 * y[6] * y[60] / L
r1420 = k1420 * y[6] * y[60] / L
r1421 = k1421 * y[6] * y[61] / L
r1422 = k1422 * y[6] * y[61] / L
r1423 = k1423 * y[6] * y[61] / L
r1424 = k1424 * y[6] * y[61] / L
r1425 = k1425 * y[6] * y[61] / L
r1426 = k1426 * y[6] * y[61] / L
r1427 = k1427 * y[6] * y[61] / L
r1428 = k1428 * y[6] * y[61] / L
r1429 = k1429 * y[6] * y[61] / L
r1430 = k1430 * y[6] * y[61] / L
r1431 = k1431 * y[6] * y[61] / L
r1432 = k1432 * y[6] * y[61] / L
r1433 = k1433 * y[6] * y[61] / L
r1434 = k1434 * y[6] * y[61] / L
r1435 = k1435 * y[6] * y[61] / L
r1436 = k1436 * y[6] * y[61] / L
r1437 = k1437 * y[6] * y[61] / L
r1438 = k1438 * y[6] * y[61] / L

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r1439 = k1439 * y[6] * y[62] / L        r1498 = k1498 * y[6] * y[67] / L
r1440 = k1440 * y[6] * y[63] / L        r1499 = k1499 * y[6] * y[67] / L
r1441 = k1441 * y[6] * y[63] / L        r1500 = k1500 * y[6] * y[67] / L
r1442 = k1442 * y[6] * y[63] / L        r1501 = k1501 * y[6] * y[67] / L
r1443 = k1443 * y[6] * y[63] / L        r1502 = k1502 * y[6] * y[67] / L
r1444 = k1444 * y[6] * y[63] / L        r1503 = k1503 * y[6] * y[67] / L
r1445 = k1445 * y[6] * y[64] / L        r1504 = k1504 * y[6] * y[67] / L
r1446 = k1446 * y[6] * y[64] / L        r1505 = k1505 * y[6] * y[67] / L
r1447 = k1447 * y[6] * y[64] / L        r1506 = k1506 * y[6] * y[67] / L
r1448 = k1448 * y[6] * y[64] / L        r1507 = k1507 * y[6] * y[67] / L
r1449 = k1449 * y[6] * y[64] / L        r1508 = k1508 * y[6] * y[67] / L
r1450 = k1450 * y[6] * y[65] / L        r1509 = k1509 * y[6] * y[67] / L
r1451 = k1451 * y[6] * y[66] / L        r1510 = k1510 * y[6] * y[67] / L
r1452 = k1452 * y[6] * y[67] / L        r1511 = k1511 * y[6] * y[67] / L
r1453 = k1453 * y[6] * y[65] / L        r1512 = k1512 * y[6] * y[67] / L
r1454 = k1454 * y[6] * y[68] / L        r1513 = k1513 * y[6] * y[68] / L
r1455 = k1455 * y[6] * y[65] / L        r1514 = k1514 * y[6] * y[68] / L
r1456 = k1456 * y[6] * y[65] / L        r1515 = k1515 * y[6] * y[68] / L
r1457 = k1457 * y[6] * y[65] / L        r1516 = k1516 * y[6] * y[68] / L
r1458 = k1458 * y[6] * y[65] / L        r1517 = k1517 * y[6] * y[68] / L
r1459 = k1459 * y[6] * y[65] / L        r1518 = k1518 * y[6] * y[68] / L
r1460 = k1460 * y[6] * y[65] / L        r1519 = k1519 * y[6] * y[68] / L
r1461 = k1461 * y[6] * y[65] / L        r1520 = k1520 * y[6] * y[68] / L
r1462 = k1462 * y[6] * y[65] / L        r1521 = k1521 * y[6] * y[68] / L
r1463 = k1463 * y[6] * y[65] / L        r1522 = k1522 * y[6] * y[68] / L
r1464 = k1464 * y[6] * y[65] / L        r1523 = k1523 * y[6] * y[68] / L
r1465 = k1465 * y[6] * y[65] / L        r1524 = k1524 * y[6] * y[68] / L
r1466 = k1466 * y[6] * y[65] / L        r1525 = k1525 * y[6] * y[68] / L
r1467 = k1467 * y[6] * y[65] / L        r1526 = k1526 * y[6] * y[68] / L
r1468 = k1468 * y[6] * y[65] / L        r1527 = k1527 * y[6] * y[68] / L
r1469 = k1469 * y[6] * y[65] / L        r1528 = k1528 * y[6] * y[68] / L
r1470 = k1470 * y[6] * y[65] / L        r1529 = k1529 * y[6] * y[68] / L
r1471 = k1471 * y[6] * y[65] / L        r1530 = k1530 * y[6] * y[68] / L
r1472 = k1472 * y[6] * y[65] / L        r1531 = k1531 * y[6] * y[71] / L
r1473 = k1473 * y[6] * y[67] / L        r1532 = k1532 * y[6] * y[71] / L
r1474 = k1474 * y[6] * y[66] / L        r1533 = k1533 * y[6] * y[71] / L
r1475 = k1475 * y[6] * y[68] / L        r1534 = k1534 * y[6] * y[71] / L
r1476 = k1476 * y[6] * y[66] / L        r1535 = k1535 * y[6] * y[71] / L
r1477 = k1477 * y[6] * y[66] / L        r1536 = k1536 * y[6] * y[71] / L
r1478 = k1478 * y[6] * y[66] / L        r1537 = k1537 * y[6] * y[71] / L
r1479 = k1479 * y[6] * y[66] / L        r1538 = k1538 * y[6] * y[71] / L
r1480 = k1480 * y[6] * y[66] / L        r1539 = k1539 * y[6] * y[71] / L
r1481 = k1481 * y[6] * y[66] / L        r1540 = k1540 * y[6] * y[72] / L
r1482 = k1482 * y[6] * y[66] / L        r1541 = k1541 * y[6] * y[72] / L
r1483 = k1483 * y[6] * y[66] / L        r1542 = k1542 * y[6] * y[72] / L
r1484 = k1484 * y[6] * y[66] / L        r1543 = k1543 * y[6] * y[72] / L
r1485 = k1485 * y[6] * y[66] / L        r1544 = k1544 * y[6] * y[72] / L
r1486 = k1486 * y[6] * y[66] / L        r1545 = k1545 * y[6] * y[72] / L
r1487 = k1487 * y[6] * y[66] / L        r1546 = k1546 * y[6] * y[72] / L
r1488 = k1488 * y[6] * y[66] / L        r1547 = k1547 * y[6] * y[72] / L
r1489 = k1489 * y[6] * y[66] / L        r1548 = k1548 * y[6] * y[72] / L
r1490 = k1490 * y[6] * y[66] / L        r1549 = k1549 * y[6] * y[72] / L
r1491 = k1491 * y[6] * y[66] / L        r1550 = k1550 * y[6] * y[72] / L
r1492 = k1492 * y[6] * y[66] / L        r1551 = k1551 * y[6] * y[72] / L
r1493 = k1493 * y[6] * y[66] / L        r1552 = k1552 * y[6] * y[72] / L
r1494 = k1494 * y[6] * y[67] / L        r1553 = k1553 * y[6] * y[72] / L
r1495 = k1495 * y[6] * y[67] / L        r1554 = k1554 * y[6] * y[72] / L
r1496 = k1496 * y[6] * y[67] / L        r1555 = k1555 * y[6] * y[72] / L
r1497 = k1497 * y[6] * y[67] / L        r1556 = k1556 * y[6] * y[72] / L
```

r1557 = k1557 * y[6] * y[72] / L
r1558 = k1558 * y[6] * y[72] / L

Finally, the additional 73 desorption rates are given by the general formulae des_i = k_des_i *Ω_i *[i] for each species i, where des_i is the desorption rates, k_des_i represents the intrinsic desorption rate constant, Ωi = [i]/$\sum$[i] represents the surface coverage as a function of time (a dimensionless quantity) and [i] is the concentration. For exemple: des_H = k_des_H * Ω_H * [H] or des_HCOOH = k_des_ HCOOH * Ω_HCOOH * [HCOOH].