

Supplement to  
**STEINER TRIPLE SYSTEMS OF ORDER 19**  
**WITH NONTRIVIAL AUTOMORPHISM GROUP**

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This supplement is an exhaustive listing of all *STS*(19) having automorphism groups of order at least 9. We employ a very succinct representation. Each design is on the symbols **a-r**, and is represented by a string of 57 symbols  $s_1 \dots s_{57}$ . Using usual lexical order, the symbol  $s_i$  is the largest element in the  $i$ th triple; the remaining two elements of the  $i$ th triple are implicitly taken to be the elements  $x_i < y_i$  for which  $\{x_i, y_i\}$  does not appear in an earlier triple, and there is no pair  $x'_i < y'_i$  with this property for which  $y'_i$  precedes  $y_i$ , or  $y_i = y'_i$  and  $x'_i$  precedes  $x_i$ . We list the systems grouped by subset of basic automorphism types, and list an automorphism group order for each:

Order Triple System

173<sup>4</sup>,113<sup>6</sup>,172<sup>6</sup>,132<sup>8</sup>  
 432 defghiihghijklmnopqrsmsnqprlnoarmqspprsqsprqoqrspsrqrss  
 108 defghiihghijklmnopqrsnomrpsqlomsnqrprnsoppqosqrsrprqsrsr  
 19<sup>1</sup>,173<sup>4</sup>  
 171 defghijklmknmopqrsmjksqnrplomrqsposrnqpsorppqrsrrsqrss  
 57 defghiihgjklmnopqrrmno slmslrponqsopqrqorpsnorqpsqssqrss  
 57 defgghijklmjnopqqkmpjrlnssmrnlopersqoqrosnppqrsppqrsrqrss  
 113<sup>6</sup>,172<sup>6</sup>,132<sup>8</sup>  
 144 defghiihghjjklmnopqrslnqopsrmpomqrsnqsornpposrqsppqrsqrss  
 96 defghiihghjjklmnopqrslnqopsrmpomqrsnqsornpposrqsppqrsqrss  
 24 defgghijklmnlipqrsqsplrknpqrlsoomrnsqponsproqrsqpsqrss  
 24 defgghijklmjnopkklqrsnqnosmormpponqmrqsrsprpsqosrqsqrss  
 24 defgghhijikjlmknopqonrslmqrsnprposqmposqnrnsqosppqrsqrss  
 24 defgghijklmnlipqrsqsplrknpqrlsoomrnsqponsproqrsqpsqrss  
 24 defgghhijikklmjnopnmqrsqolrsprnsmpqoposqnrnpsqsppqrsqrss  
 24 defgghijklmnlipqrsqsplrknpqrlsoomrnsqponsproqrsqpsqrss  
 24 defgghhijikijlmnopqrslnqopsrmpomqrsnqsornpposrqsppqrsqrss  
 24 defgghhijikijlmnopqrslnqopsrmpomqrsnqsornpposrqsppqrsqrss  
 24 defgghhijikklmjnopqrsqrlpsoonsqprmrpqsnsopqrsrpsqrss  
 24 defgghhijiklmnopqrkoqlpsqlrosnmmsprspqorsqorppsrqsqrss  
 24 defgghhijikjlmknopqrsqrlpsoonsqprmrpqsnsopqrsrpsqrss  
 24 defgghijklmjnopkljmqrpsqornosmnoqsrppsrqsprqorqsqrss  
 12 defgghhijklmno plqnrnlrsmqspqrolmno pnsnsropqopsrrqsqrss  
 12 defgghhijklmno plqnrnlrsmqspqrolmno pnsnsropqopsrrqsqrss  
 12 defgghhijklmno plqnrnlrsmqspqrolmno pnsnsropqopsrrqsqrss  
 12 defgghhijklmno plqnrnlrsmqspqrolmno pnsnsropqopsrrqsqrss  
 12 defgghhijklmno plqnrnlrsmqspqrolmno pnsnsropqopsrrqsqrss  
 12 defgghhijklmno plqnrnlrsmqspqrolmno pnsnsropqopsrrqsqrss  
 12 defgghhijklmno plqnrnlrsmqspqrolmno pnsnsropqopsrrqsqrss  
 12 defgghhijklmno plqnrnlrsmqspqrolmno pnsnsropqopsrrqsqrss  
 12 defgghhijklmno plqnrnlrsmqspqrolmno pnsnsropqopsrrqsqrss  
 173<sup>4</sup>,113<sup>6</sup>,172<sup>6</sup>  
 54 defgghhijklmno plqnrnlrsmqspqrolmno pnsnsropqopsrrqsqrss  
 54 defgghhijklmno plqnrnlrsmqspqrolmno pnsnsropqopsrrqsqrss  
 18 defgghhijklmno plqnrnlrsmqspqrolmno pnsnsropqopsrrqsqrss  
 18 defgghhijklmno plqnrnlrsmqspqrolmno pnsnsropqopsrrqsqrss



For group orders at least four, we give one representative  $STS(19)$  for each subset of basic automorphism types:

Order	Triple System
$1^3 2^8 1^7 2^6$	
8	defgghijklmnoimakojopqrsipqrsmnpqrnusrqoqsporspqrqrs
4	defggthijklmnoopqrsqprslmnoenpqrpmoorsppqrsqrsrs
$1^3 2^8$	
8	defggthijklmnooppqrsqprslmnoormoqnsqprsqprsqrs
4	defggthijklmnooplqrsrppqnoasrqpmpoqsnrroqppqrsqrs
$1^1 2^9 1^1 3^6$	
6	defghihjiklmmomlqrsopnrsqonsqmsocqprsqprsqrsrs
$1^1 3^6 1^1 3^2 8$	
6	defggghijklmmopkqmrsozrlqprnqspmoqprsonsprqorpsqrsrs
$1^1 3^6 1^7 2^6$	
6	defggthijklmmomkmpoqlrsisrqpmpsrqorsqpaqppropsqrsrs
$1^3 2^9 1^7 3^4$	
6	defggthijklmnoimkpxrnrkslpomqpsqomrpornsqsrqppqrsqrs
$1^7 2^6 1^7 3^4$	
6	defggthijklmnoimkpxrnrsmqomrqsiporismqonsrpoqprsqrsrs
$1^7 2^6$	
4	defggthijklmmoppqrsmpsnlrqoospqnrqorqprsqprsqrs