

# Identification des constantes pour les cycles de Kaprekar

## Par Stéphane RAVARY - 2022

### Recherche des cycles pour $m = 3$

[954]

### Recherche des cycles pour $m = 4$

[7641]

### Recherche des cycles pour $m = 5$

[99954, 95553]

[97641, 98622, 97533, 96543]

[97731, 98532, 97443, 96642]

### Recherche des cycles pour $m = 6$

[766431]

[995544]

[876420, 875421, 875430, 885420, 886320, 866322, 665442]

### Recherche des cycles pour $m = 7$

[9865422, 9776331, 9855432, 9875430, 9965421, 9877221, 9864432, 9775431]

### Recherche des cycles pour $m = 8$

[76664331]

[98754210]

[86654430, 88763220, 86654322]

[87664320, 87654321, 87654330, 88654320, 88663320, 86663322, 66654432]

### Recherche des cycles pour $m = 9$

[987654321]

[999555444]

[986554422, 987763320, 996554331, 988663320, 996654321, 987763221, 986554332, 987654330, 997554411, 988863210, 997644321, 987754221, 986654322, 977663331]

### Recherche des cycles pour $m = 10$

[7666643331]  
[9876543210]  
[9987542100]  
[8866544310, 8877632220, 8665544322]  
[8887632210, 8766543222, 8665544430]  
[8666544330, 8876633220, 8666543322]  
[9887542110, 9877542210, 9875544210]  
[8766643320, 8766543321, 8766543330, 8866543320, 8866633320, 8666633322, 6666544332]

### Recherche des cycles pour $m = 11$

[98766543321]  
[98876543220, 99766543311, 98876543211, 98776543221, 98765544321]  
[98776633320, 99665544321, 98877632220, 99665543331, 98866633320, 99666543321,  
98776633221, 98665544322]

### Recherche des cycles pour $m = 12$

[766666433331]  
[987665433210]  
[998765432100]  
[999875421000]  
[999955554444]  
[888665443110, 887776322220, 866555444322]  
[888876322110, 877665432222, 866555444430]  
[866665443310, 887766332220, 866655443322]  
[888766332210, 876665433222, 866655444330]  
[866665443330, 887666333220, 866665433322]  
[886655444310, 888776322210, 876655443222]  
[988875421110, 987775422210, 987555444210]  
[988765432110, 987765432210, 987655443210]  
[988755442110, 988775422110, 987755442210]  
[998875421100, 998775422100, 998755442100]  
[876666433320, 876665433321, 876665433330, 886665433320, 886666333320, 866666333322,  
666665443332]

### Recherche des cycles pour $m = 13$

[9876665433321]  
[9966655443321, 9887766332220]  
[9887665433220, 9976665433311, 9887665433211, 9877665433221, 9876655443321]  
[9887655443220, 9987665433210, 9987665433111, 9887765432211, 9877655443221]  
[9887765432220, 9976655443311, 9888765432210, 9977665433211, 9887655443211]

### Recherche des cycles pour $m = 14$

[76666664333331]  
[98766654333210]  
[98877554422110]  
[99876654332100]  
[99987654321000]  
[99998754210000]  
[88886654431110, 88777763222220, 86655554444322]  
[88888763221110, 87776654322222, 86655554444430]  
[88866654433110, 88777663322220, 86665554443322]  
[88887663322110, 87766654332222, 86665554444330]  
[88666654433310, 88776663332220, 86666554433322]  
[88876663332210, 87666654333222, 86666554443330]  
[86666654433330, 88766663333220, 86666654333322]  
[88866554443110, 88877763222210, 87665554443222]  
[88666554443310, 88877663322210, 87666554433222]  
[88665554444310, 88887763222110, 87766554432222]  
[98888754211110, 98777754222210, 98755554444210]  
[98887654321110, 98777654322210, 98765554443210]  
[98876654332110, 98776654332210, 98766554433210]  
[98887554421110, 98877754222110, 98775554442210]  
[98876554432110, 98877654322110, 98776554432210]  
[98875554442110, 98887754221110, 98777554422210]  
[99888754211100, 99877754222100, 99875554442100]  
[99887654321100, 99877654322100, 99876554432100]  
[99887554421100, 99887754221100, 99877554422100]  
[99988754211000, 99987754221000, 99987554421000]  
[87666664333320, 87666654333321, 87666654333330, 88666654333320, 88666663333320,  
86666663333322, 66666654433332]

### Recherche des cycles pour m = 15

[987666654333321]  
[99999555544444]  
[996666554433321, 988776663332220]  
[988766654333220, 997666654333311, 988766654333211, 987766654333221, 987666554433321]  
[988766554433220, 998766654333210, 998766654333111, 988776654332211, 987766554433221]  
[988776654332220, 997666554433311, 988876654332210, 997766654333211, 988766554433211]  
[988776554432220, 998766554433210, 998876654332110, 998776654332111, 988776554432211]  
[998776654332210, 998766554433111, 988877654322210, 997766554433211, 988876554432210]

### Recherche des cycles pour m = 16

[766666643333331]  
[9876666543333210]  
[9887765544322110]  
[9987666543332100]  
[9988775544221100]  
[9998766543321000]  
[9999876543210000]

[9999987542100000]  
[9987776554432221, 9987766554433221]  
[8888866544311110, 887777632222220, 866555544444322]  
[8888887632211110, 877776654322222, 866555544444430]  
[8888666544331110, 887777663322220, 866655544443322]  
[8888876633221110, 877766654332222, 866655544444330]  
[8886666544333110, 887776663332220, 866665544433322]  
[8888766633322110, 877666654333222, 866665544443330]  
[8866666544333310, 887766663333220, 866666544433332]  
[8887666633332210, 876666654333322, 866666544433330]  
[8666666544333330, 887666663333320, 866666654333332]  
[8888665544431110, 888777763222210, 876655544443222]  
[888666544433110, 888777663322210, 876665544433222]  
[886666544433310, 888776663332210, 876666544433322]  
[888665544443110, 888877763222210, 877665544432222]  
[886665544443310, 888877663322210, 877666544332222]  
[886655544444310, 888887763222110, 877766544322222]  
[9888887542111110, 987777754222210, 987555544444210]  
[9888876543211110, 987777654322210, 987655544443210]  
[9888766543321110, 987776654332210, 987665544433210]  
[9887666543332110, 987766654333210, 987666544333210]  
[988887544211110, 988777754222110, 987755544442210]  
[988876544321110, 988777654322110, 987765544432210]  
[988766544332110, 988776654332210, 987766544332210]  
[988875544421110, 988877754222110, 987775544422210]  
[988765544432110, 988877654322110, 987776544322210]  
[988755544442110, 988887754221110, 987777544222210]  
[988877544221110, 988777544222110, 988775544422110]  
[9988887542111100, 998777754222100, 998755544442100]  
[9988876543211100, 998777654322100, 998765544432100]  
[9988766543321100, 9987766543322100, 998766544332100]  
[998887544211100, 998877754222100, 998775544422100]  
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[998875544421100, 998887754221100, 998777544222100]  
[9998887542111000, 9998777542221000, 999875544421000]  
[9998876543211000, 9998776543221000, 999876544321000]  
[999887544211000, 9998877542211000, 999877544221000]  
[9999887542110000, 9999877542210000, 999987544210000]  
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8866666633333320, 8666666633333322, 6666666544333332]

### Recherche des cycles pour m = 17

[98766666543333321]  
[99887765544322110]  
[9966666544333321, 9887766663333220]  
[98876666543333220, 99766666543333311, 98876666543333211, 98776666543333221,  
9876666544333321]  
[98876665544333220, 99876666543333210, 99876666543333111, 98877666543332211,  
9877666544333221]

[98877666543332220, 99766665544333311, 98887666543332210, 99776666543333211, 98876665544333211]  
[98877665544332220, 99876665544333210, 99887666543332110, 99877666543332111, 98877665544332211]  
[99877666543332210, 99876665544333111, 98887766543322210, 99776665544333211, 98887665544332210]  
[99877665544332210, 99887665544332110, 99887766543322110, 99877665544332111, 98887765544322210]

### Recherche des cycles pour $m = 18$

[7666666643333331]  
[9876666543333210]  
[988776655443322110]  
[99876665433332100]  
[998877655443221100]  
[998877665544332211]  
[999876665433321000]  
[999887755442211000]  
[999987665433210000]  
[999998765432100000]  
[99999955555444444]  
[999999875421000000]  
[888888665443111110, 88777776322222220, 86655555444444322]  
[88888876322111110, 87777766543222222, 8665555544444430]  
[888886665443311110, 88777766332222220, 86655555444443322]  
[88888766332211110, 8777666543322222, 8665555544444330]  
[88886665443331110, 88777766333222220, 86665555444433322]  
[88887666333221110, 8777666543332222, 8666555544443330]  
[88866665443333110, 88777666333322220, 86666555444433322]  
[88887666333322110, 8776666543333222, 86666555444433330]  
[88666665443333310, 88776666333332220, 86666655444333322]  
[8887666633332210, 876666654333322, 8666665544433330]  
[8666666544333330, 8876666633333220, 8666666543333322]  
[88886655444311110, 8887777632222210, 8766555544443222]  
[88886655444331110, 8887776633222210, 8766555544443222]  
[88866655444333110, 8887776633322210, 87666555444333222]  
[88666655444333310, 8887766633332210, 87666655443333222]  
[88886655444431110, 8888777632222110, 87766555444432222]  
[88866655444433110, 8888777633222210, 87766555444332222]  
[88666655444433310, 8888776633322210, 87766655443332222]  
[88866555444443110, 8888877632222110, 87776655444322222]  
[88666555444443310, 8888877633222110, 87776655443322222]  
[88665555444444310, 88888877632221110, 87777665544322222]  
[98888875421111110, 98777775422222210, 98755555444444210]  
[988888765432111110, 987777765432222210, 98765555444443210]  
[988887665433211110, 987777665433222210, 98766555444433210]  
[988876665433321110, 987776665433322210, 98766655444333210]  
[988766665433332110, 987766665433332210, 98766655443333210]  
[98888875442111110, 98877775422222110, 98775555444442210]  
[988887655443211110, 988777765432222110, 98776555444432210]

[988876655443321110, 988777665433222110, 987766555444332210]  
[988766655443332110, 988776665433322110, 987766655443332210]  
[988887555444211110, 988877775422221110, 987775555444422210]  
[988876555444321110, 988877765432221110, 987776555444322210]  
[988766555444332110, 988877665433221110, 987776655443322210]  
[988875555444421110, 988887775422211110, 987777555444222210]  
[988765555444432110, 988887765432211110, 987777655443222210]  
[988755555444442110, 988888775422111110, 987777755442222210]  
[988887755442211110, 988777755442222110, 987775555444422110]  
[988877655443221110, 988777655443222110, 987776555444322110]  
[988877555444221110, 988877755442221110, 987777555444222110]  
[988888875421111100, 9877777542222100, 998755555444442100]  
[988888765432111100, 9877776543222100, 998765555444432100]  
[988887665433211100, 98777665433222100, 998766555444332100]  
[988876665433321100, 98776665433322100, 998766655443332100]  
[988888755442111100, 98877775422221100, 998775555444422100]  
[988887655443211100, 98877765432221100, 998776555444322100]  
[988876655443321100, 98877665433221100, 998776655443322100]  
[98887555444211100, 988887775422211100, 998777555444222100]  
[988876555444321100, 988887765432211100, 998777655443222100]  
[988875555444421100, 988888775422111100, 998777755442222100]  
[988887755442211100, 988777755442221100, 998877555444221100]  
[999888875421111000, 99987777542221000, 999875555444421000]  
[999888765432111000, 999877765432221000, 999876555444321000]  
[999887665433211000, 999877665433221000, 999876655443321000]  
[999888755442111000, 999887775422211000, 999877555444221000]  
[999887655443211000, 999887765432211000, 999877655443221000]  
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88666666633333320, 86666666633333322, 66666666544333332]

### Recherche des cycles pour $m = 19$

[98766666543333321]  
[9988776655443322110]  
[9998877655443221100]  
[996666665544333321, 98877666633333220]  
[9988877655443221110, 9988777655443222110, 9988776555444322110]  
[988766665433333220, 99766666543333311, 98876666543333211, 98776666543333221,  
98766665544333321]  
[9887666655443333220, 998766665433333210, 99876666543333311, 9887766665433332211,  
9877666655443333221]  
[9887766665433332220, 9976666655443333311, 9888766665433332210, 997766666543333211,  
9887666655443333211]  
[9887766655443332220, 9987666655443333210, 9988766665433332110, 9987766665433332111,  
9887766655443332211]

[9987766665433332210, 9987666655443333111, 9888776665433322210, 9977666655443333211, 9888766655443332210]  
[9987766655443332210, 9988766655443332110, 9988776665433322110, 9987766655443332111, 9888776655443322210]

### Recherche des cycles pour $m = 20$

[766666666433333331]  
[987666665433333210]  
[98877666554433322110]  
[98887775554442221110]  
[998766665433332100]  
[99887766554433221100]  
[99887766655443332211]  
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[99988776554432211000]  
[9999876665433210000]  
[99998877554422110000]  
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[99999987654321000000]  
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[8888886654431111110, 887777776322222220, 8665555554444444322]  
[8888888763221111110, 8777777665432222222, 8665555554444444430]  
[88888866654433111110, 8877777666332222220, 8665555554444444332]  
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[888876666333322110, 877666665433332222, 8666665554444333330]  
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[888766666333332210, 876666665433333222, 8666666554443333330]  
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[8888866655444331110, 8887777663332222210, 8766655554444433222]  
[888666655444333310, 8887776663333222210, 8766665554443333222]  
[8866666554443333310, 888776666333322210, 8766666554433333222]  
[8888665554444311110, 888877776322222110, 8776655554444432222]  
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[888666555444433310, 8888776663332222110, 8776666554443332222]  
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[98888887654321111110, 9877777765432222210, 9876555554444443210]





[9998875554444211000, 9998887754221111000, 99987777554422221000]  
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99887776655443322211, 9988776655444332211]  
[8766666664333333320, 8766666665433333321, 8766666665433333330,  
8866666665433333320, 8866666666333333320, 866666666333333322,  
6666666665443333332]