Problem	Complexity	
	Sequential	Parallel (with number of processors)
recognition	O(n) [19]	
isomorphism	O(n) [20]	O($log(n)$) with O($n^{1.5}\sqrt{log(n)}$) [13]
		O(n^3) with O($n^{1.5}/log^2 n$) [14]
maximum independent set	NP-C [10] [6] [2]	† O($log^2 n$) with O(n^3) [26]
maximum clique	O(n) [32]	
coloring	[36] [30] [1]	
5-coloring	O($nlogn$) [23]	O($lognlogn^* n$) with O($n/(lognlog^* n)$ [16]
	O(n) [28] [5] [9]	
edge coloring	O(n) [18]	O($log^2 n$) [18]
Hamiltonian path	NP-C [10] [2]	
Hamiltonian cycle	NP-C [11] [2]	
dominating clique	?	
independent dominating set	?	
dominating cycle	?	
minimum cut	O($(nlogn)^2$) [35]	
	$O(n \log^2(n))$[33]	
	O($nlogn$) [7]	
maximum cut	[15]	
	* O($n^{1.5} logn$) [34]	
steiner forest		O($log^2 n$) with O($n^2/logn$) [37]
SPGC?	[38]	
all shortest pathes	O(n^2) [8][7]	O($log^2 n + log^3 q$) with O(nq) [31]
		O($log^4 n$) with O($n^2/log^2 n$) [22]
maximum matching	* O($n^{1.5} logn$) [25]	
	O($n^{0.5} m$) [29]	
parity path	?	
all pairs longest chains	?	
embeding	O(n) [4]	
maximum plannar subgraph	O(n^2) [21]	
	O($mlogn$) [3]	
separator	O(n) [24]	[12]
	($nlogn$) [25]	
connected component		O($logn$) with O(n+m) [17]
spanning tree		O($logn$) with O(n+m) [17]
multicomodity flows	O($n^{2.5} logn$) [27]	
minimum vertex cover	NP-C [10] [2]	
minmum dominating set	NP-C [10] [2]	
minmum edge dominating set	NP-C [10] [2]	

* weighted version † maximal independent set

References

[1] K Apple and W. Haken. Every planar map is four colorable. *Bull. Amer. Math. Soc.*, 82:711–712, 1976.
ANNOTATION: The proof of that every planar graph is four colorable is given.
KEY: AppHak76

[2] B S Baker. Approximation algorithms for np-complete problems on planar graphs. *Journal of the Association for Computing Machinery*, 41:153–180, 1994.
ANNOTATION: The paper dscribe a technique to obtain approximation schemas for various NP-complete problem in planar graph . It decomposes a planar graph into subgraphs of a form called k-outer planar graph and combines optimal solution for k-outer planar subgraphs
KEY: Bak94

[3] Jiazhen Cai, Xiaofeng Han, and Robert E. Tarjan. O($mlogn$)-time algorithm for the maximal planar subgraph problem. *SIAM Journal on Computing*, 22:1142–1162, 1993.
ANNOTATION: An O($mlogn$)-time algorithm for finding a maximal planar subgraph in a graph.
KEY: CaiHanTar93

[4] N. Chiba, T Nishizeki, S Abe, and T Ozawa. A linear algorithm for embedding planar graphs using pq-tree. *J. comput system Sci.*, 30:54–76, 1985.
ANNOTATION: An O(n) algorithm for embedding a planar graph
KEY: ChiNisAbeOza85

[5] N. Chiba, T Nishizeki, and N Saito. A linear 5-coloring algorithm of planar graphs. *J algorithms*, 2:317–327, 1981.
ANNOTATION: An O(n) algorithm of 5-coloring planar graphs
KEY: ChiNisSai81

[6] Norishige Chiba, Takao Nishizeki, and Nobuji Saito. An approximation algorithm for the maximum independent set problem on planar graph. *SIAM J. Comput*, 4:663–675, 1982.
ANNOTATION: The the maximum independent set problem is NP. An approximation algorithm for the maximum independent set problem on planar graph is given
KEY: ChiNisSai82

[7] Greg N. Federickson. Fast algorithms for shortes paths in planar graphs, with applications. *SIAM Journal on Computing*, 16:1004–1022, 1987.
ANNOTATION: It uses graph decomposition and data structure techniques to yield fast algorithm for a number of shortest path and related problems An O$n\sqrt{logn}$) algorithm for single source problem, An O(n^2) algorithm for all pairs shortest pathes problem and an O(nlogn) algorithm for min cut problem
KEY: Fre87B

[8] Greg N. Federickson. New approach to all paris shortest paths in planar graphs. In *Conference Proceedings of the Annual ACM Symposium on Theory of Computing 19th*, pages 19–28, 1987.
ANNOTATION: An O(n^2) algorithm for all paris shortest paths in planar graphs
KEY: Fre87A

[9] Greg N. Frederickson. On linear-time algorithms for five-coloring planar graphs. *Information Processing letters*, 19:219–224, 1984.
ANNOTATION: O(n) algorithms
KEY: Fre84

[10] MR Garey and D S Johnson. *Computers and Intractability: a Guide to the theory of NP Completeness*. 1979.
ANNOTATION: Introduction of NP problems
KEY: GarJoh79

[11] M.R. Garey, D. S. Johnson, and R.E. Tarjan. The planar hamiltonian circuit problem is np-complete. *SIAM Journal on Computing*, 5, 1976.
ANNOTATION: Proof of that the planar Hamiltonian circuit problem is NP-complete
KEY: GarJohTar76

[12] H Gazit and Gary L. Miller. A deterministic parallel algorithm for finding a sepatator in planar graph. Technical report, Technical Rept. CMU-CS-91-103 CMU, 1991.
ANNOTATION: Seperator of a planar graph is useful for many kind of problems in planar graph. The paper gives a deterministic parallel algorithm for finding a sepatator in planar graph
KEY: GazMil91

[13] H Gazit and J H. Reif. A randomized paralled algorithm for planar graph isomorphism. In *In 2nd Annual ACM Symposium on parallel algorithms and architectures*, pages 210–219, 1990.
ANNOTATION: An algorithm of O(*log(n)*) with O($n^{1.5}\sqrt{log(n)}$) processors for testing planar graph isomorphism
KEY: GazRei90

[14] Hillel Gazit. A deterministic parallel algorithm for planar graphs isomorphism. In *Collection: 32nd Annual Symposium on Foundations of Computer Science*, pages 723–732. San Juan, PR, 1991, 1991.
ANNOTATION: We present a deterministic parallel algorithm to determine whether two planar graphs are isomorphic. The algorithm needs $O(\log n)$ separators that have to be computed one after the other.
KEY: Gaz91

[15] F Hadlock. Finding a maximum cut of a planar graph in polynomial time. *SIAM J Comput*, 4:221–225, 1975.
ANNOTATION: A proof that the maximum cut problem can be translated into a maximum weighted matching problem for which there exists a polynomial bounded algorithm
KEY: Had75

[16] T Hagerup, M Chrobak, and K Diks. Optimal parallel 5-coloring of planar graphs. *SIAM J Comput*, 18:288–300, 1989.
ANNOTATION: An parallel 5-coloring algorithm of planar graphs , which take O($lognlogn^*n$) steps with O($n/(lognlog^*n)$ processors. It does not require a planar embedding to be given as part of input.
KEY: HagChrDik89

[17] Torben Haoerup. Optimal parallel algorithms on planar graphs. *Information and Computation*, 84:71–96, 1990.
ANNOTATION: An O(logn) algorithm with O(n+m) processors for finding connected components and spanning tree in planar graph
KEY: Hag90

[18] Xin He. An efficient algorithm for edge coloring planar graphs with δ colors. *Theoretical-Computer-Science*, 74:299–312, 1990.
ANNOTATION: 'An efficient algorithm for edge coloring a planar graph G, the complexity of sequential implementation is O(n), the complexity of parallel implementation is (log^2n) time with O(n) processors.
KEY: He90

[19] H. Hopcrof and R. E. Tarjan. Efficient planarity testing. *Journal of ACM*, 21, 1974.
ANNOTATION: An O(n) algorithm for testing if a graph is planar
KEY: HopTar74

[20] J.E. Hopcroft and J.K. Wong. Linear time algorithm for isomorphism of planar graphs. In *Preceedings of the 6th Annual ACM Symposium on Theory of Computing*, pages 172–184, 1974.
ANNOTATION: An O(n) algorithm for testing the isomorphism of planar graphs
KEY: HopWon74

[21] R. Jayakumar, K. Thulasiraman, and M. N. S. Swamy. O(n^2) algorithm for graph planarization. *IEEE trans CAD*, 8:257–267, 1989.
ANNOTATION:
KEY: jayThuSwa89

[22] A. Lingas. Efficient parallel algorithms for path problems in planar directed graphs. In *Algorithms, International SIGAL 90*, pages 447–457. 1990.
ANNOTATION: An algorithm O(log^4n) with O(n^2/log^2n) processors for finding all shortest pathes
KEY: Ling90

[23] R. J. Lipton and T. E. Miller. A batching method for coloring planar graphs. *Inform Processing Lett*, 7:185–186, 1978.
ANNOTATION: It gives an algorithm O(nlogn)find 5-coloring in planar graph
KEY: LipMil78

[24] R. J. Lipton and R. E. Tarjan. A separator theorem for planar graphs. *SIAM J Appl. Math*, 36:177–189, 1979.

ANNOTATION: A separator theorem and a linear algorithm for finding the separator are given in the paper.
KEY: LipTar79

[25] R. J. Lipton and R. E. Tarjan. Applications of a planar sepatator theorem. *SIAM J Comput*, 9, 1980.
ANNOTATION: Use the planar sepatator theorem to explore sveral problems in planar graph including NP-C problem,Maxium matching , etc
KEY: LipTar80

[26] M Luby. A simple parallel algorithm for the maximal independent set. *SICOMP*, 15, 1986.
ANNOTATION: It gives an parallel algorithm for mazimal independent set with $O(log^2 n)$ time in $O(n^3)$ processors
KEY: Lub86

[27] Kazuhiko Matsumoto, Takao Nishizeki, and Nobuji Saito. Planar multicommodity flows, maximum matchings and negative cycles. *SIAM-Journal-on-Computing*, 15:495–510, 1986.
ANNOTATION: This paper deals with the multicommodity flow problem on a class of planar graphs G
KEY: MatNisSai86

[28] D. Matula, Y Shiloach, and R Tarjan. Two linear time algorithms for 5-coloring a planar graph. Technical report, Rept STAN-CS-80-830 Department of Computer Science, Stanford University, 1980.
ANNOTATION:
KEY: MatShiTar80

[29] S Micali and V. Vazirani. An o($n^{1/2}m$) algorithm for finding maximum matching in general graphs. In *21th Annual Symp. on Found . of Comp. Sci.*, pages 17–27. 1980.
KEY: MicVaz80

[30] Oystein Ore. *The four color problem.* Academic Press, 1967.
KEY: Ore67

[31] G. E. Pantziou, P. G. Spirakis, and C. D. Zaroliagis. Efficient parallel algorithms for shortest paths in planar graphs. In *SWAT 90. 2nd Scandinavian Workshop on Algorithm theory*, pages 288–300, 1990.
ANNOTATION: A parallel algorithm of $(log^2 n + log^3 q)$ with O(nq) processors for finding the shortest paths in planar graphs. q is the number of faces that cover all the vertices
KEY: PanSpiZar90

[32] Christos H Papadimitriou and Mihalis Yannakakis. The clique problem for planar graphs. *Inform. Process Lett.*, 13:131–133, 1981.
ANNOTATION: The paper show that a planar graph can not contain a 5-clique. The maximum clique problem can be solved by list all triples and 4-clique. It can be done

in O(n) time.
KEY: PapYan81

[33] John H. Reif. Minimum $s-t$ cut of a planar undirected network in $o(n \log^2(n))$ time. *SIAM-Journal-on-Computing*, 12:71–81, 1983.
ANNOTATION: This paper presents an $O(n \log^2(n))$ algorithm for computing a minimum (cost) s-t cut of a planar undirected network
KEY: Rei83

[34] Wei-Kuan Shih, Kuo Wu, and Y. S. Kuo. Unifying maximum cut and minimum cut of a planar graph. *IEEE Transactions on Computers*, 39:694–697, 1990.
ANNOTATION: An O($n^{1.5} logn$) algorithm for finding maximum cut in weighted planar graph
KEY: ShiWuKuo90

[35] Yossi Shiloach. A multiterminal minimum cut algorithm for planar graphs. *SIAM-Journal-on-Computing*, 9:219–224, 1980.
ANNOTATION: This paper presents an algorithm for computing all minimum cuts between all pairs of vertices in an undirected connected planar graph having n vertices in time $O((nlogn)^2)$
KEY: Shi80

[36] L. Stockmeyer. Planar 3-colorability is polynomal complete. *SIGACT News*, 5:19–25, 1973.
ANNOTATION: Proof 3-coloring planar graph is polynomal complete
KEY: Sto73

[37] H Suzuki, C Yamanaka, and T Nishizeki. Parallel algorithms for finding steiner forests in planar graphs. In *Algorithms International Symposium SIGAL '90 Preceedings*, pages 458–467, 1990.
ANNOTATION: 4 parallel algorithms for finding steiner forests under different conditions in planar graphs
KEY: SuzYamNis90

[38] Alan Tucker. The strong perfect graph conjecture for planar graphs. *Canad. J. Math.*, 25:103–114, 1973.
ANNOTATION: I can not find the journal in the libraries that I can access right now.
KEY: Tuc73