

Generating function for the number of perfect matchings
in $C_{10} \times C_n$ graph

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> Gf:=2*z^3*(2527+
213224*z-
6541757*z^2-
128180158*z^3+
3601232562*z^4+
31631873258*z^5-
933556860989*z^6-
4322064053616*z^7+
143604093038510*z^8+
367065361275168*z^9-
14664434894757945*z^10-
20256798879847232*z^11+
1062276707928121195*z^12+
710947583129164938*z^13-
57024092671486764540*z^14-
12704456194258392362*z^15+
2339479664609796384495*z^16-
140080211160279173012*z^17-
75045648196140760901300*z^18+
17763341792915665240728*z^19+
1915376106979700693170565*z^20-
657306841239938840209952*z^21-
39432248708936779954080015*z^22+
15861229007256282293537038*z^23+
662040942434634133497898650*z^24-
284227633526467448472210562*z^25-
9146363763310550983029502615*z^26+
3979146603423596851404550208*z^27+
104756852829379443642414704630*z^28-
44718762183042052866408238792*z^29-
1000991735869161311117775509331*z^30+
410448885890523502145212874536*z^31+
8023345515257473879473137267001*z^32-
3114635974738711623741508457178*z^33-
54202949893594605425409649752016*z^34+
19722961454200941288172701489314*z^35+
309927209149416474967741652927517*z^36-
104995614310983488726109353396364*z^37-
1505547044168250039852765629594160*z^38+
472766873705466648214828471348384*z^39+
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6234233170374367479152765888393590*z^40-
1809713953032753762866312077210256*z^41-
22071213920220669884638712473638690*z^42+
5914594782312288250401985184698804*z^43+
66985104969228102638285797010918180*z^44-
16564133356644213806216004745371036*z^45-
174684068120393530634902311686963330*z^46+
39871907858885797371827670858119264*z^47+
392219255708164336151703005946479580*z^48-
82703154800995763009243278897031456*z^49-
759535875779075973368538188175265082*z^50+
148126241041127715646773449318966240*z^51+
1270346336042395099251088878679535662*z^52-
229459238691037666115956350435315068*z^53-
1837089074280760333239286542248765672*z^54+
307803249332019219907808330338305436*z^55+
2298914174181064389127424099882982134*z^56-
357845276381310873665354341270922760*z^57-
2490701721753789842851247328220390200*z^58+
360717732678031739883312351341653136*z^59+
2336800995579397045926589061078506442*z^60-
315299936136719369802291394604915360*z^61-
1898413083778505222202690482034283742*z^62+
238911793458943798147964033901901308*z^63+
1334966049863094509136891188821531652*z^64-
156826373847376012455515208562499396*z^65-
812036096856939060340180216987981454*z^66+
89086562358756403627243456542592960*z^67+
426868846920779817923094968127018460*z^68-
43730798928648229538735485697119536*z^69-
193681841245843441372831798879089190*z^70+
18515383810881233280979752537687024*z^71+
75734264721904883021646628389192690*z^72-
6745917355338589065901719027164116*z^73-
25474789384022603776587718648731280*z^74+
2109080806155325543107384541840644*z^75+
7355633196057297026772255370101530*z^76-
563942911909677888037238273707736*z^77-
1818723313871379479286210640259120*z^78+
128453146229020402390087289644704*z^79+
384027108150890097411261864733851*z^80-
24807544704195073201355464052504*z^81-

69036118124258160357151990772721*z^82+
4039458372697686310450875619690*z^83+
10529979113580252190989355624106*z^84-
550835628264360655183764999982*z^85-
1357561076199451598177580363217*z^86+
62376672778901330693644599696*z^87+
147302745151489111205020836470*z^88-
5801962337819484645416955072*z^89-
13386539215716391390720730525*z^90+
436621873021994497924100128*z^91+
1013207959717035509267924375*z^92-
25976511565243188948882222*z^93-
63453640875899759886279420*z^94+
1172652333896897758706798*z^95+
3262575630787906367968715*z^96-
36531916391867114080292*z^97-
136434707075111646647220*z^98+
527458138622753930648*z^99+
4587006457945469010625*z^100+
15656468479339480448*z^101-
122206456884199294275*z^102-
1285946829226789482*z^103+
2532765368892135650*z^104+
43904104113783718*z^105-
39856246228766795*z^106-
945344814531712*z^107+
460728095714350*z^108+
13616416252088*z^109-
3730948465527*z^110-
129587086296*z^111+
19656570277*z^112+
769866446*z^113-
59047872*z^114-
2525830*z^115+
74009*z^116+3364*z^117)/
((1-z)*(1+z)*(-1+2*z+z^2)*(-1-2*z+z^2)*
(1+z-3*z^2-z^3+z^4)*(1+9*z+21*z^2+9*z^3+z^4)*
(1+19*z+41*z^2+19*z^3+z^4)*(1-19*z+41*z^2-19*z^3+z^4)*
(1-9*z+21*z^2-9*z^3+z^4)*(1-z-3*z^2+z^3+z^4)*
(1-22*z+29*z^2+396*z^3-67*z^4-396*z^5+29*z^6+22*z^7+z^8)*
(1-14*z+29*z^2+84*z^3-91*z^4-84*z^5+29*z^6+14*z^7+z^8)*
(1-2*z-31*z^2-24*z^3+53*z^4+24*z^5-31*z^6+2*z^7+z^8)*

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(1+2*z-31*z^2+24*z^3+53*z^4-24*z^5-31*z^6-2*z^7+z^8)*  
(1-9*z^2+21*z^4-9*z^6+z^8)*(1-19*z^2+41*z^4-19*z^6+z^8)*  
(1-z-31*z^2+71*z^3+44*z^4-71*z^5-31*z^6+z^7+z^8)*  
(1+z-31*z^2-71*z^3+44*z^4+71*z^5-31*z^6-z^7+z^8)*  
(1+14*z+29*z^2-84*z^3-91*z^4+84*z^5+29*z^6-14*z^7+z^8)*  
(1-153*z^2+6303*z^4-58851*z^6+115400*z^8-58851*z^10+  
6303*z^12-153*z^14+z^16):
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```
> degree(denom(Gf));
```

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> series(Gf, z, 9);
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5054 z3 + 537636 z4 + 2540032 z5 + 114557000 z6 + 1034315998 z7 + 33898728836 z8 + O(z9)
```