Date: 2023-06-06 **Report CNC Parametric Curve Interpolation and Trajectory Tracking**
Author: wruslandr@gmail.com **Part 3 of 5 Circle and Astepi (x-y) parametric curves**

| ITEM | DESCRIPTION | CIRCLE CURVE | | | | | ASTEROID + EPICYCLOID CURVE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **FC10** | **FC20** | **FC25** | **FC30** | **FC40** | **FC10** | **FC20** | **FC25** | **FC30** | **FC40** |
| 1 | Run user feedrate command (mm/s) | | | | | | | | | | |
| 2 | Total interpolated u-points | 49641 | 24822 | 19859 | 16549 | 12413 | 76275 | 38169 | 30563 | 25499 | 19184 |
| 3 | Parameter completion (reached u-end) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | **Pushdown epsilon eps(u) algorithm** | | | | | | | | | | |
| 4 | Count before pushdown, eps(u) is below (1E-6) | 49641 | 24822 | 19859 | 16549 | 12413 | 76275 | 38061 | 30413 | 25309 | 18917 |
| 5 | Count pushdown points, eps(u) to below (1E-6) | 0 | 0 | 0 | 0 | 0 | 0 | 108 | 150 | 190 | 267 |
| 6 | Check Total u-points | 49641 | 24822 | 19859 | 16549 | 12413 | 76275 | 38169 | 30563 | 25499 | 19184 |
| | **Epsilon eps(u) chord error** | | | | | | | | | | |
| 7 | Count eps(u) above (1E-6) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | Count eps(u) in (1E-7, 1E-6) | 0 | 6959 | 17603 | 16549 | 12413 | 407 | 820 | 4011 | 6679 | 13976 |
| 9 | Count eps(u) in (1E-8, 1E-7) | 49641 | 17863 | 2256 | 0 | 0 | 23373 | 37349 | 26552 | 18820 | 5208 |
| 10 | Count eps(u) in (1E-9, 1E-8) | 0 | 0 | 0 | 0 | 0 | 52495 | 0 | 0 | 0 | 0 |
| 11 | Count eps(u) in (1E-10, 1E-9) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 | Count eps(u) below (1E-10) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 | Check Total eps(u) points | 49641 | 24822 | 19859 | 16549 | 12413 | 76275 | 38169 | 30563 | 25499 | 19184 |
| | **Count interpolated u-points** | | | | | | | | | | |
| 14 | Count_rising_S_curve u-points | 2483 | 1242 | 993 | 828 | 621 | 4437 | 2219 | 1775 | 1479 | 1110 |
| 15 | Count_frate is_lower than fratelimit | 22363 | 11171 | 8936 | 7449 | 5586 | 33349 | 16686 | 13352 | 11144 | 8085 |
| 16 | Count_frate is_equal to fratelimit | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | Count_frate is_higher than fratelimit | 22313 | 11168 | 8937 | 7445 | 5585 | 35536 | 17787 | 14254 | 11891 | 9250 |
| 18 | Count_falling_S_curve u-points | 2482 | 1241 | 993 | 827 | 621 | 2953 | 1477 | 1182 | 985 | 739 |
| 19 | Check Total u-points | 49641 | 24822 | 19859 | 16549 | 12413 | 76275 | 38169 | 30563 | 25499 | 19184 |
| | **Count u-points histogram (G01 codes)** | | | | | | | | | | |
| 20 | Count u-points [0.00 <= u < 0.10) | 4964 | 2482 | 1985 | 1654 | 1241 | 8110 | 4055 | 3244 | 2704 | 2028 |
| 21 | Count u-points [0.10 <= u < 0.20) | 4964 | 2482 | 1986 | 1655 | 1241 | 4901 | 2478 | 2009 | 1702 | 1334 |
| 22 | Count u-points [0.20 <= u < 0.30) | 4964 | 2482 | 1986 | 1655 | 1241 | 7391 | 3696 | 2957 | 2464 | 1848 |
| 24 | Count u-points [0.30 <= u < 0.40) | 4964 | 2482 | 1986 | 1655 | 1241 | 7234 | 3617 | 2894 | 2412 | 1809 |
| 25 | Count u-points [0.40 <= u < 0.50) | 4964 | 2482 | 1986 | 1655 | 1242 | 9182 | 4592 | 3673 | 3061 | 2297 |
| 26 | Count u-points [0.50 <= u < 0.60) | 4964 | 2483 | 1985 | 1655 | 1241 | 7216 | 3608 | 2887 | 2406 | 1804 |
| 27 | Count u-points [0.60 <= u < 0.70) | 4964 | 2482 | 1986 | 1655 | 1241 | 9831 | 4916 | 3933 | 3278 | 2458 |
| 28 | Count u-points [0.70 <= u < 0.80) | 4964 | 2482 | 1986 | 1655 | 1241 | 7525 | 3763 | 3010 | 2508 | 1882 |
| 29 | Count u-points [0.80 <= u < 0.90) | 4964 | 2482 | 1986 | 1654 | 1242 | 8801 | 4401 | 3521 | 2935 | 2201 |
| 30 | Count u-points [0.90 <= u <= 1.00] | 4965 | 2483 | 1987 | 1656 | 1242 | 6084 | 3043 | 2435 | 2029 | 1523 |
| 31 | Check Total u-points | 49641 | 24822 | 19859 | 16549 | 12413 | 76275 | 38169 | 30563 | 25499 | 19184 |
| 32 | **Total curve error (sum of epsilon(u))** | 0.001094 | 0.001094 | 0.002188 | 0.002735 | 0.004375 | 0.00084 | 0.001642 | 0.00202 | 0.00239 | 0.003111 |
| 33 | **Total dist traversed (sum of chord lengths)** | 496.3786 | 496.3772 | 496.3964 | 496.3757 | 496.3943 | 426.2622 | 426.262 | 426.262 | 426.262 | 426.262 |

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| | **NOTES** | | | | | | | | | | | |
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Sheet1