The velocity is tabulated below:

|  |  |  |
| --- | --- | --- |
| Time | v(by Runge-Kutta approximation) | Theoretical value |
| 0 | 0 | 0 |
| 0.15 | 1.47118 | 1.47118 |
| 0.3 | 2.9404 | 2.9404 |
| 0.45 | 4.40575 | 4.40575 |
| 0.6 | 5.8653 | 5.8653 |
| 0.75 | 7.31717 | 7.31717 |
| 0.9 | 8.75951 | 8.75951 |
| 1.05 | 10.1905 | 10.1905 |
| 1.2 | 11.6085 | 11.6085 |
| 1.35 | 13.0117 | 13.0117 |
| 1.5 | 14.3986 | 14.3986 |
| 1.65 | 15.7676 | 15.7676 |
| 1.8 | 17.1174 | 17.1174 |
| 1.95 | 18.4465 | 18.4465 |
| 2.1 | 19.7537 | 19.7537 |
| 2.25 | 21.0379 | 21.0379 |
| 2.4 | 22.298 | 22.298 |
| 2.55 | 23.5331 | 23.5331 |
| 2.7 | 24.7424 | 24.7424 |
| 2.85 | 25.9249 | 25.9249 |
| 3 | 27.0803 | 27.0803 |
| 3.15 | 28.2078 | 28.2078 |
| 3.3 | 29.307 | 29.307 |
| 3.45 | 30.3777 | 30.3777 |
| 3.6 | 31.4194 | 31.4194 |
| 3.75 | 32.4322 | 32.4322 |
| 3.9 | 33.4158 | 33.4158 |
| 4.05 | 34.3702 | 34.3702 |
| 4.2 | 35.2956 | 35.2956 |
| 4.35 | 36.1921 | 36.1921 |
| 4.5 | 37.0598 | 37.0598 |
| 4.65 | 37.8991 | 37.8991 |
| 4.8 | 38.7102 | 38.7102 |
| 4.95 | 39.4936 | 39.4936 |
| 5.1 | 40.2496 | 40.2496 |
| 5.25 | 40.9787 | 40.9787 |
| 5.4 | 41.6814 | 41.6814 |
| 5.55 | 42.3583 | 42.3583 |
| 5.7 | 43.0098 | 43.0098 |
| 5.85 | 43.6366 | 43.6366 |
| 6 | 44.2393 | 44.2393 |
| 6.15 | 44.8184 | 44.8184 |
| 6.3 | 45.3747 | 45.3747 |
| 6.45 | 45.9087 | 45.9087 |
| 6.6 | 46.421 | 46.421 |
| 6.75 | 46.9125 | 46.9125 |
| 6.9 | 47.3836 | 47.3836 |
| 7.05 | 47.835 | 47.835 |
| 7.2 | 48.2674 | 48.2674 |
| 7.35 | 48.6814 | 48.6814 |
| 7.5 | 49.0777 | 49.0777 |
| 7.65 | 49.4569 | 49.4569 |
| 7.8 | 49.8195 | 49.8195 |
| 7.95 | 50.1663 | 50.1663 |
| 8.1 | 50.4977 | 50.4977 |
| 8.25 | 50.8145 | 50.8145 |
| 8.4 | 51.117 | 51.117 |
| 8.55 | 51.406 | 51.406 |
| 8.7 | 51.6819 | 51.6819 |
| 8.85 | 51.9453 | 51.9453 |
| 9 | 52.1966 | 52.1966 |
| 9.15 | 52.4364 | 52.4364 |
| 9.3 | 52.6651 | 52.6651 |
| 9.45 | 52.8833 | 52.8833 |
| 9.6 | 53.0913 | 53.0913 |
| 9.75 | 53.2896 | 53.2896 |
| 9.9 | 53.4786 | 53.4786 |
| 10.05 | 53.6588 | 53.6588 |
| 10.2 | 53.8304 | 53.8304 |
| 10.35 | 53.9939 | 53.9939 |
| 10.5 | 54.1497 | 54.1497 |
| 10.65 | 54.2981 | 54.2981 |
| 10.8 | 54.4394 | 54.4394 |
| 10.95 | 54.5739 | 54.5739 |
| 11.1 | 54.702 | 54.702 |
| 11.25 | 54.8239 | 54.8239 |
| 11.4 | 54.94 | 54.94 |
| 11.55 | 55.0505 | 55.0505 |
| 11.7 | 55.1556 | 55.1556 |
| 11.85 | 55.2556 | 55.2556 |
| 12 | 55.3508 | 55.3508 |
| 12.15 | 55.4413 | 55.4413 |
| 12.3 | 55.5275 | 55.5275 |
| 12.45 | 55.6094 | 55.6094 |
| 12.6 | 55.6874 | 55.6874 |
| 12.75 | 55.7615 | 55.7615 |
| 12.9 | 55.832 | 55.832 |
| 13.05 | 55.8991 | 55.8991 |
| 13.2 | 55.9629 | 55.9629 |
| 13.35 | 56.0235 | 56.0235 |
| 13.5 | 56.0811 | 56.0811 |
| 13.65 | 56.1359 | 56.1359 |
| 13.8 | 56.1881 | 56.1881 |
| 13.95 | 56.2376 | 56.2376 |
| 14.1 | 56.2847 | 56.2847 |
| 14.25 | 56.3295 | 56.3295 |
| 14.4 | 56.372 | 56.372 |
| 14.55 | 56.4125 | 56.4125 |
| 14.7 | 56.4509 | 56.4509 |
| 14.85 | 56.4875 | 56.4875 |
| 15 | 56.5222 | 56.5222 |
| 15.15 | 56.5552 | 56.5552 |
| 15.3 | 56.5866 | 56.5866 |
| 15.45 | 56.6164 | 56.6164 |
| 15.6 | 56.6447 | 56.6447 |
| 15.75 | 56.6717 | 56.6717 |
| 15.9 | 56.6973 | 56.6973 |
| 16.05 | 56.7216 | 56.7216 |
| 16.2 | 56.7447 | 56.7447 |
| 16.35 | 56.7666 | 56.7666 |
| 16.5 | 56.7875 | 56.7875 |
| 16.65 | 56.8073 | 56.8073 |
| 16.8 | 56.8261 | 56.8261 |
| 16.95 | 56.844 | 56.844 |
| 17.1 | 56.861 | 56.861 |
| 17.25 | 56.8772 | 56.8772 |
| 17.4 | 56.8925 | 56.8925 |
| 17.55 | 56.9071 | 56.9071 |
| 17.7 | 56.921 | 56.921 |
| 17.85 | 56.9341 | 56.9341 |
| 18 | 56.9466 | 56.9466 |
| 18.15 | 56.9585 | 56.9585 |
| 18.3 | 56.9698 | 56.9698 |
| 18.45 | 56.9805 | 56.9805 |
| 18.6 | 56.9907 | 56.9907 |
| 18.75 | 57.0004 | 57.0004 |
| 18.9 | 57.0096 | 57.0096 |
| 19.05 | 57.0183 | 57.0183 |
| 19.2 | 57.0266 | 57.0266 |
| 19.35 | 57.0345 | 57.0345 |
| 19.5 | 57.042 | 57.042 |
| 19.65 | 57.0491 | 57.0491 |
| 19.8 | 57.0558 | 57.0558 |
| 19.95 | 57.0623 | 57.0623 |
| 20.1 | 57.0684 | 57.0684 |
| 20.25 | 57.0741 | 57.0741 |
| 20.4 | 57.0796 | 57.0796 |
| 20.55 | 57.0849 | 57.0849 |
| 20.7 | 57.0898 | 57.0898 |
| 20.85 | 57.0946 | 57.0946 |
| 21 | 57.099 | 57.099 |
| 21.15 | 57.1033 | 57.1033 |
| 21.3 | 57.1073 | 57.1073 |
| 21.45 | 57.1112 | 57.1112 |
| 21.6 | 57.1148 | 57.1148 |
| 21.75 | 57.1183 | 57.1183 |
| 21.9 | 57.1216 | 57.1216 |
| 22.05 | 57.1247 | 57.1247 |
| 22.2 | 57.1277 | 57.1277 |
| 22.35 | 57.1305 | 57.1305 |
| 22.5 | 57.1332 | 57.1332 |
| 22.65 | 57.1357 | 57.1357 |
| 22.8 | 57.1381 | 57.1381 |
| 22.95 | 57.1404 | 57.1404 |
| 23.1 | 57.1426 | 57.1426 |
| 23.25 | 57.1447 | 57.1447 |
| 23.4 | 57.1466 | 57.1466 |
| 23.55 | 57.1485 | 57.1485 |
| 23.7 | 57.1503 | 57.1503 |
| 23.85 | 57.152 | 57.152 |
| 24 | 57.1536 | 57.1536 |
| 24.15 | 57.1551 | 57.1551 |
| 24.3 | 57.1565 | 57.1565 |
| 24.45 | 57.1579 | 57.1579 |
| 24.6 | 57.1592 | 57.1592 |
| 24.75 | 57.1605 | 57.1605 |
| 24.9 | 57.1616 | 57.1616 |
| 25.05 | 57.1628 | 57.1628 |
| 25.2 | 57.1638 | 57.1638 |
| 25.35 | 57.1648 | 57.1648 |
| 25.5 | 57.1658 | 57.1658 |
| 25.65 | 57.1667 | 57.1667 |
| 25.8 | 57.1676 | 57.1676 |
| 25.95 | 57.1684 | 57.1684 |
| 26.1 | 57.1692 | 57.1692 |
| 26.25 | 57.1699 | 57.1699 |
| 26.4 | 57.1706 | 57.1706 |
| 26.55 | 57.1713 | 57.1713 |
| 26.7 | 57.1719 | 57.1719 |
| 26.85 | 57.1725 | 57.1725 |
| 27 | 57.1731 | 57.1731 |
| 27.15 | 57.1736 | 57.1736 |
| 27.3 | 57.1741 | 57.1741 |
| 27.45 | 57.1746 | 57.1746 |
| 27.6 | 57.1751 | 57.1751 |
| 27.75 | 57.1755 | 57.1755 |
| 27.9 | 57.176 | 57.176 |
| 28.05 | 57.1764 | 57.1764 |
| 28.2 | 57.1767 | 57.1767 |
| 28.35 | 57.1771 | 57.1771 |
| 28.5 | 57.1774 | 57.1774 |
| 28.65 | 57.1778 | 57.1778 |
| 28.8 | 57.1781 | 57.1781 |
| 28.95 | 57.1784 | 57.1784 |
| 29.1 | 57.1786 | 57.1786 |
| 29.25 | 57.1789 | 57.1789 |
| 29.4 | 57.1792 | 57.1792 |
| 29.55 | 57.1794 | 57.1794 |
| 29.7 | 57.1796 | 57.1796 |
| 29.85 | 57.1798 | 57.1798 |
| 30 | 57.18 | 57.18 |