



1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

١٠٠٠

1. The first of these is the fact that the system is not a simple one, and that the results are not always the same. The second is that the system is not a simple one, and that the results are not always the same.

[illegible]

1. The first step in the process of creating a new product is to identify a market need. This involves conducting market research to understand the preferences and behaviors of potential customers.

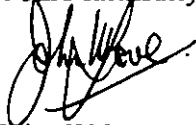
The following is a list of the names of the persons who have been appointed to the various positions in the various departments of the Government of the State of New York, for the year 1900.

(b) all other authorities conferred on the Directors prior to the date of passing of the resolution to allot relevant securities are hereby revoked"

- 2 "That pursuant to the Resolution numbered 2 in the notice convening this Meeting and Section 95(1) of the Companies Act 1985 (as amended) ("the Act"), Section 89(1) of the Act shall not apply to any allotment of shares in the capital of the company "

I would apologise for this return being submitted late

Yours faithfully,

A handwritten signature in black ink, appearing to read 'John W Love', written over a horizontal line.

John W Love,  
Company Secretary

(a) The first part of the question asks for the value of  $\lambda$  such that the matrix  $A - \lambda I$  is singular. This occurs when the determinant of  $A - \lambda I$  is zero. The matrix  $A$  is given by:

$$A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 4 \\ 3 & 4 & 1 \end{pmatrix}$$

The determinant of  $A - \lambda I$  is:

$$\det(A - \lambda I) = \begin{vmatrix} 1-\lambda & 2 & 3 \\ 2 & 1-\lambda & 4 \\ 3 & 4 & 1-\lambda \end{vmatrix}$$

Expanding this determinant, we get:

$$(1-\lambda)((1-\lambda)(1-\lambda) - 16) - 2(1-\lambda)(1-\lambda) - 3(1-\lambda)(1-\lambda)$$

Simplifying, we find:

$$-(1-\lambda)^3 + 16(1-\lambda) - 2(1-\lambda) - 3(1-\lambda) = 0$$

This simplifies to:

$$-(1-\lambda)^3 + 11(1-\lambda) = 0$$

Factoring out  $(1-\lambda)$ , we get:

$$(1-\lambda)(-(1-\lambda)^2 + 11) = 0$$

This gives us two cases:  $1-\lambda = 0$  or  $-(1-\lambda)^2 + 11 = 0$ . The first case gives  $\lambda = 1$ . The second case gives:

$$-(1-\lambda)^2 + 11 = 0 \implies (1-\lambda)^2 = 11 \implies 1-\lambda = \pm\sqrt{11} \implies \lambda = 1 \pm \sqrt{11}$$

Therefore, the values of  $\lambda$  are  $1$ ,  $1 + \sqrt{11}$ , and  $1 - \sqrt{11}$ .

(b) The second part of the question asks for the eigenvectors corresponding to the eigenvalue  $\lambda = 1$ . We substitute  $\lambda = 1$  into the matrix  $A - \lambda I$ :

$$A - I = \begin{pmatrix} 0 & 2 & 3 \\ 2 & 0 & 4 \\ 3 & 4 & 0 \end{pmatrix}$$

We need to find the null space of this matrix. The system of equations is:

$$\begin{cases} 2x + 3y = 0 \\ 2x + 4y = 0 \\ 3x + 4y = 0 \end{cases}$$

From the first two equations, we get  $x = -\frac{3}{2}y$  and  $x = -2y$ . Equating these, we get  $-\frac{3}{2}y = -2y \implies y = 0$ . Substituting  $y = 0$  into the first equation, we get  $x = 0$ . Therefore, the only eigenvector corresponding to  $\lambda = 1$  is the zero vector.

(c) The third part of the question asks for the eigenvectors corresponding to the eigenvalue  $\lambda = 1 + \sqrt{11}$ . We substitute  $\lambda = 1 + \sqrt{11}$  into the matrix  $A - \lambda I$ :

$$A - (1 + \sqrt{11})I = \begin{pmatrix} -\sqrt{11} & 2 & 3 \\ 2 & -\sqrt{11} & 4 \\ 3 & 4 & -\sqrt{11} \end{pmatrix}$$

We need to find the null space of this matrix. The system of equations is:

$$\begin{cases} -\sqrt{11}x + 2y + 3z = 0 \\ 2x - \sqrt{11}y + 4z = 0 \\ 3x + 4y - \sqrt{11}z = 0 \end{cases}$$

This system is more complex to solve, but it can be done using standard linear algebra techniques. The eigenvectors will be non-zero vectors in the null space of the matrix.