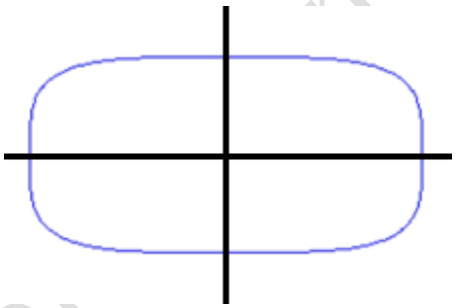
6. BÖLÜM
ANALİTİK EĞRİLER

Tıpta ve teknolojide kullanılan bazı analitik eğriler mevcuttur. Bunların bazıları Kartezyen koordinat sisteminde, bazıları kutupsal koordinat sisteminde, bazıları parametrik denklemlerde çizilebilir. Burada Kartezyen koordinat sisteminde denklemleri oluşturulan ve grafikleri çizilen analitik eğrilerden bahsedeceğiz.

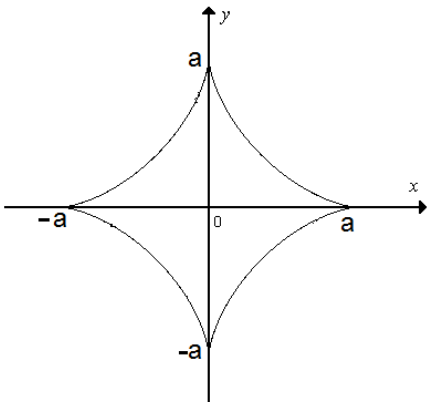
1. Lame Eğrisi:

$$\left(\frac{x}{a}\right)^n + \left(\frac{y}{b}\right)^n = 1$$



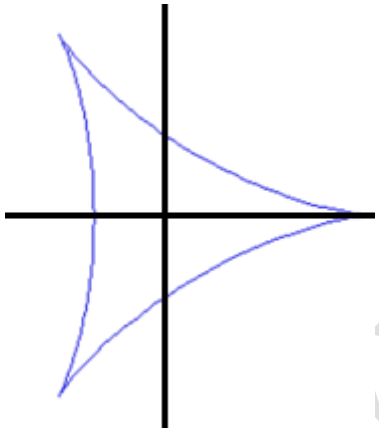
2. Dört Dişli Eğrisi (Bernoulli, Leibniz):

$$x^{2/3} + y^{2/3} = a^{2/3}$$



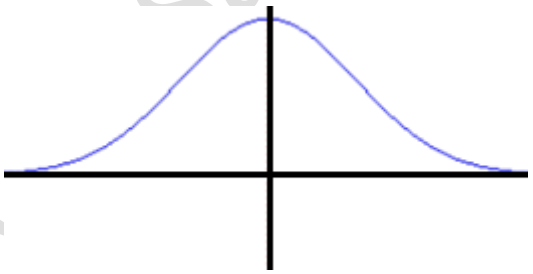
3. Üç Dişli Eğrisi (Euler, Steiner):

$$(x^2+y^2+12ax+9a^2)^2=4a(2x+3a)^3$$



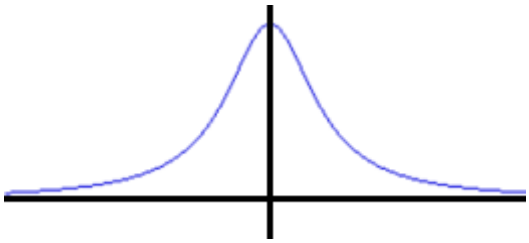
4. Frekans Eğrisi (De Moivre, Laplace, Gauss):

$$y=\sqrt{2\pi}.e^{-x^2/2}$$



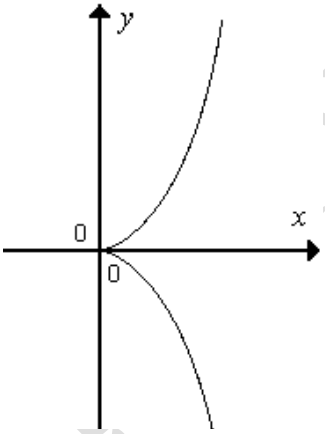
5. Angesi Eğrisi (Fermat, Grandi, Angesi):

$$y(x^2+a^2)=a^3$$



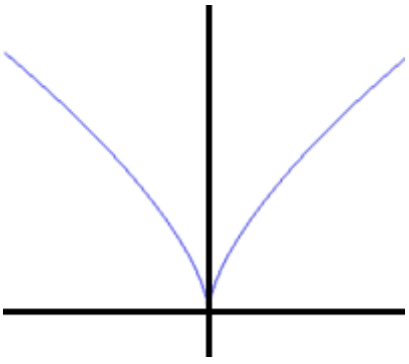
6. Diocles Sarmaşığı (Diocles, Geminus):

$$y^2 = \frac{x^3}{2a - x}$$



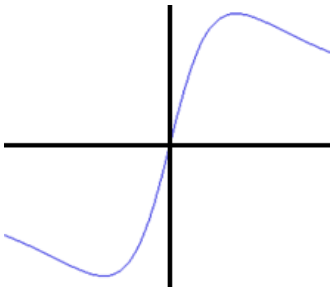
7. Yarı Kübik Parabolü (Neile, Wallis, Heuraet):

$$y^3 = ax^2$$



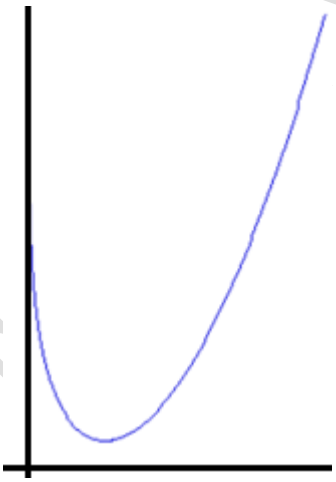
8. Solucan Eğrisi (L'Hopital, Huygens, Newton):

$x^2y + aby - a^2x = 0,\ ab > 0$



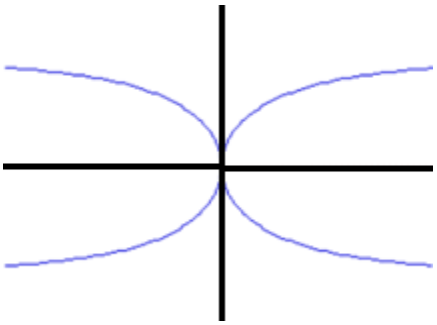
9. Takip Eğrisi (Bouguer, Maskelyne):

$y = cx^2 - \log x$



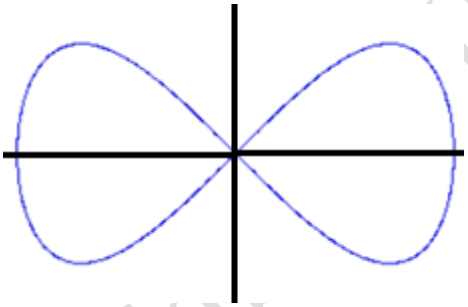
10. Kappa Eğrisi (Gutschoven, Newton, Bernoulli):

$y^2(x^2 + y^2) = a^2x^2$



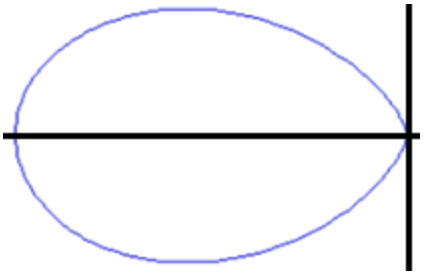
11. Gerono Kurdelesi (Gerono, Bernoulli, Fagranı, Euler):

$$(x^2+y^2)^2=a^2(x^2-y^2)$$



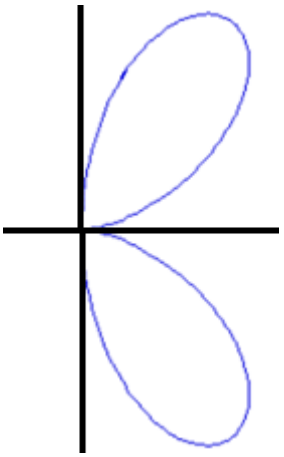
12. Tek Yaprak:

$$r=-b\cos\theta+4a\cos\theta\sin^2\theta$$



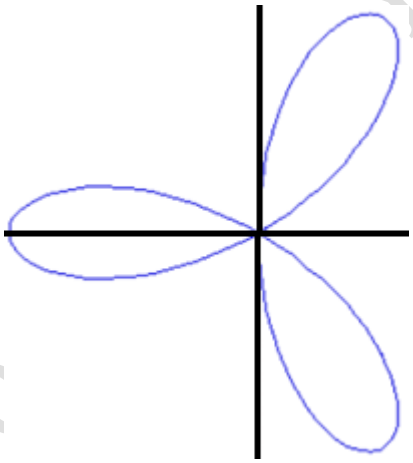
13. Çift Yaprak:

$$r=4a\cos\theta\sin^2\theta$$



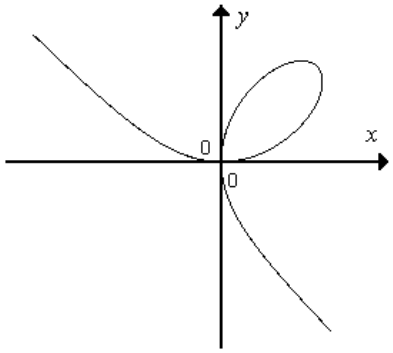
14. Üç Yaprak:

$$(x^2+y^2)(y^2+x(x+a))=4axy^2$$



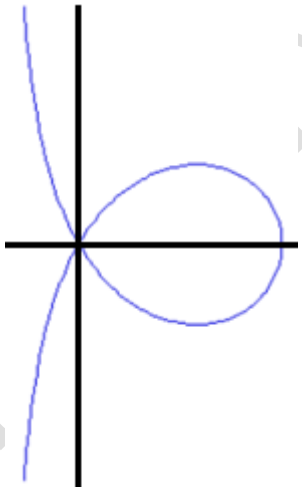
15. Descartes Yaprağı:

$$x^3+y^3-3axy=0$$



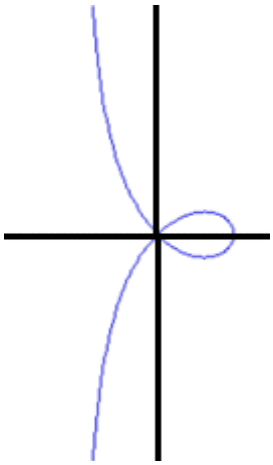
16. Sluze Kabuğu:

$$a(x-a)(x^2+y^2)=k^2x^2$$



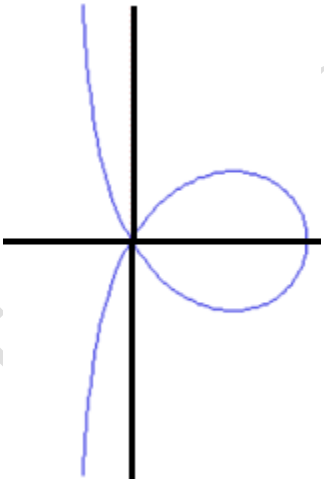
17. Sağ-Sol Bükük İp (Barrow, Torricelli, Roberval):

$$y^2=\frac{x^2(a-x)}{a+x}$$



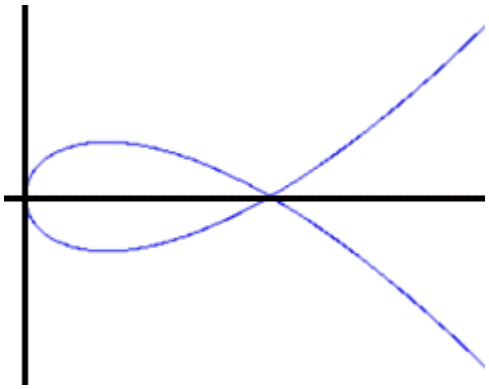
18. Mc Laurin Bağı:

$y^2(a+x)=x^2(3a-x)$



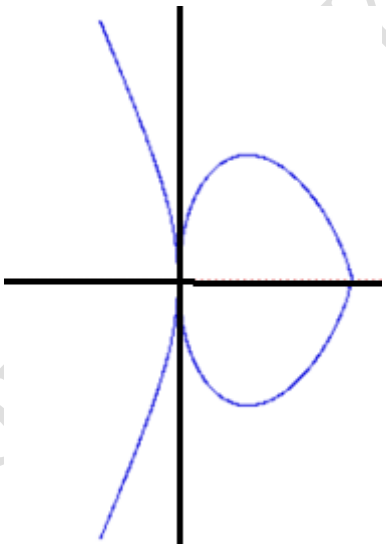
19. Catanal-Tschirnhaus Bağı:

$3ay^2=x(x-a)^2$



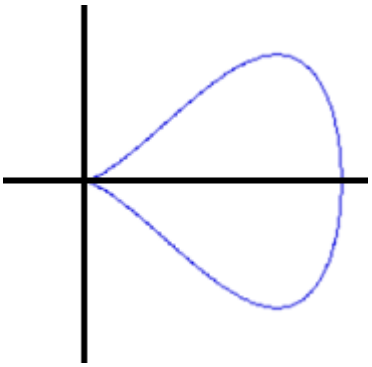
20. Sluze İncisi (Sluze, Pascal):

$y^n = k(a-x)^p x^m$, (n,m çift, p tek)



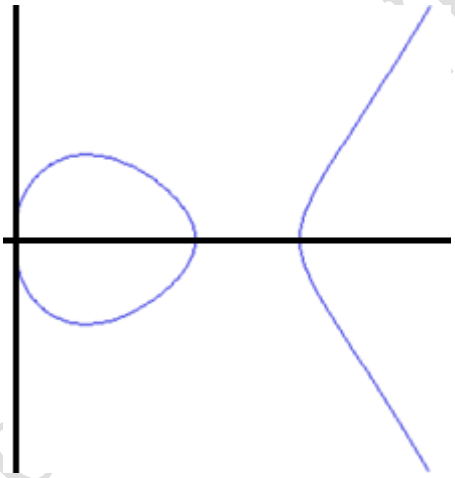
21. Armutsu Kuartik (Longchamps):

$b^2x^2 = x^3(a-x)$



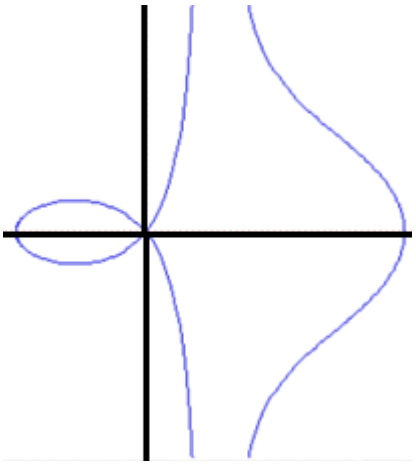
22. Newton'un Ayrık Parabolü

$ay^2 = x(x^2 - 2bx + c), \quad a > 0$



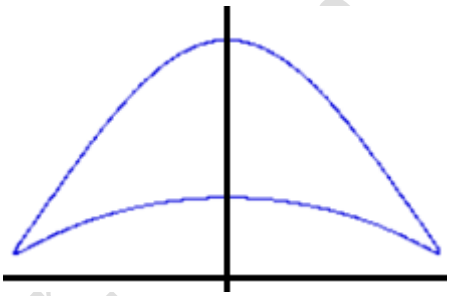
23. Kabuksu Eğrisi (Nicomedes, Pappus):

$(x-b)^2(x^2+y^2) - a^2x^2 = 0$



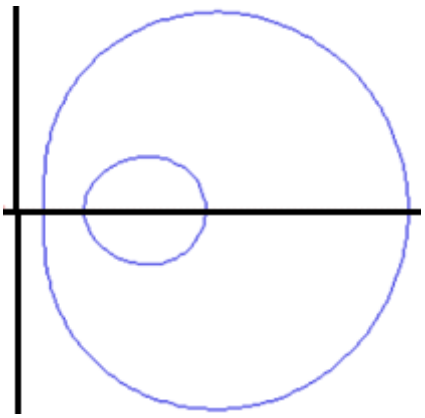
24. Horozlu Şapka (Sylvester, Cayley):

$$y^2(a^2-x^2)=(x^2+2ay-a)^2$$



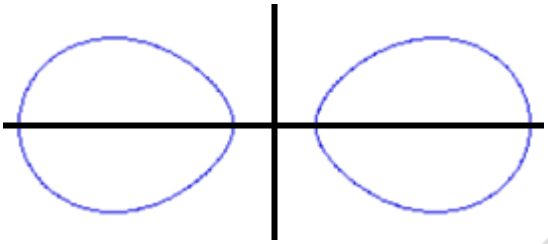
25. Kartezyen Ovaller (Descartes, Newton):

$$((1-m^2)(x^2+y^2)+2m^2cx+a^2-m^2c^2)^2=4a^2(x^2+y^2)$$



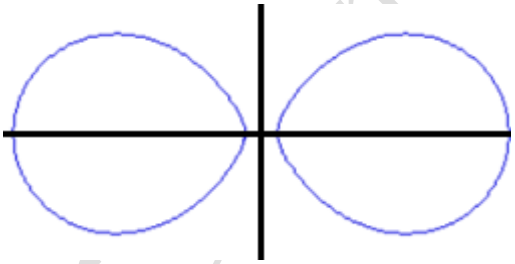
262. Cassinian Ovalleri:

$$(x^2+y^2)^2-2a^2(x^2+y^2)+a^4-c^4=0$$



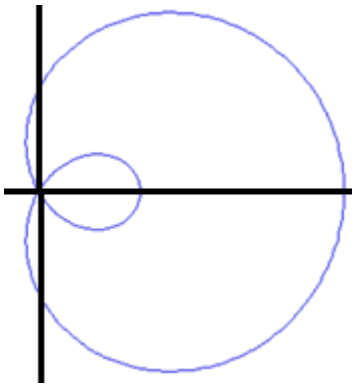
27. Spirik Bölmeler (Perseus):

$$(r^2-a^2+c^2+x^2+y^2)^2=4r^2(x^2+c^2)$$



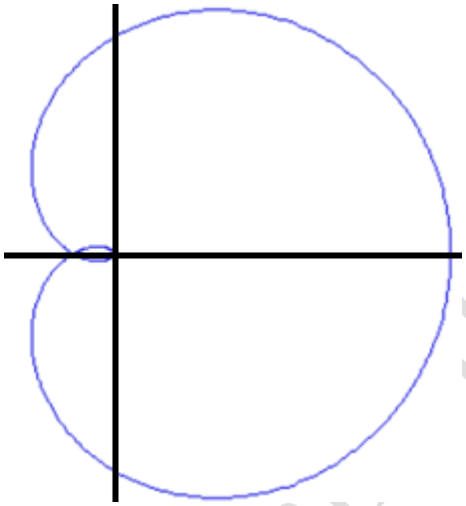
28. Paskal Salyangozu (Dürer, Pascal, Roberval, Mersenne):

$$(x^2+y^2-2ax)^2=a^2(x^2+y^2)$$



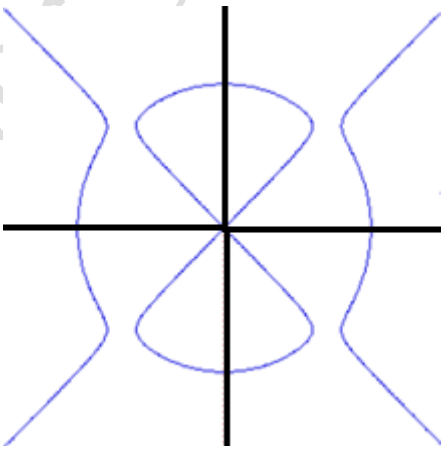
29. Cayley Sekstiki (Mc Laurin, Cayley)

$$4(x^2+y^2-ax)^3=27a^2(x^2+y^2)^2$$



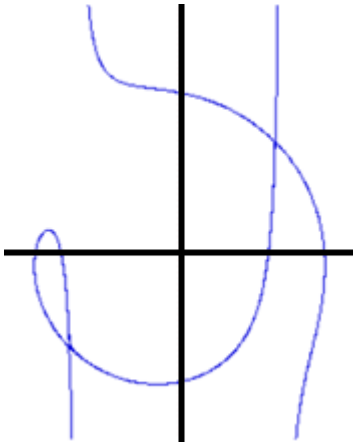
30. Şeytan Eğrisi (Cramer, Lacroix):

$$y^2-x^2+ay^2+bx^2=0$$



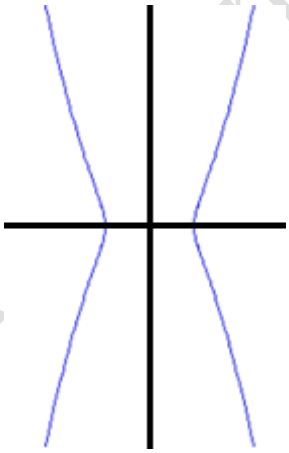
31. Dürer Kabuğu:

$$(x^2+xy+ax-b^2)^2=(b^2-x^2)(x-y+a)^2$$



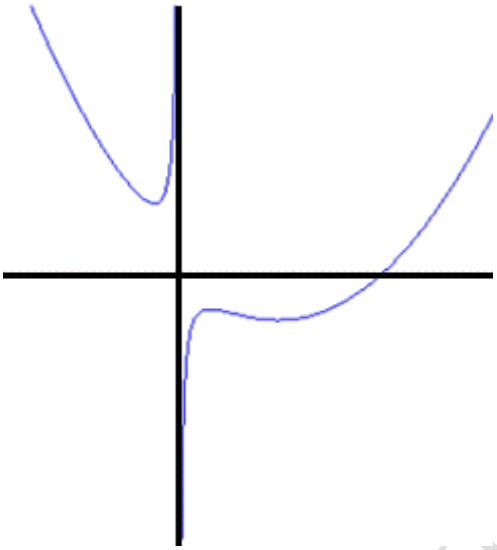
32. Eudoxus-Clairaut Eğrisi:

$$a^2x^4 = b^4(x^2 + y^2)$$



33. Newton Zıpkını (Newton, Descartes, Euler, Plücker)

$$xy = cx^3 + dx^2 + ex + f$$



KAYNAKÇA

1. H. Hilmi HACISALİHOĞLU, 2ve 3 Boyutlu Uzayda Analitik Geometri, 7. Bakı, 2005, ANKARA.